ARCHIVES OF OTOLOGY.

ESCAPE OF CEREBRO-SPINAL FLUID THROUGH THE NOSE, IN CONJUNCTION WITH ATROPHY OF THE OPTIC NERVES, PROBABLY CAUSED BY THE PERFORATION OF THE WALL OF THE SPHENOIDAL SINUS BY A TUMOR OF THE HYPOPHYSIS.[1]

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Translated by Dr. Edw. Preble, New York.

CONSTANT dripping from the nose of a limpid fluid having the composition of the cerebro-spinal liquid, and bilateral atrophy of the optic nerves, together with a striking degree of weakness of the limbs, were the most noteworthy phenomena in the following case, which was observed at my clinic. As I find in literature some eight cases in which "hydrorrhœa nasalis" was associated with bilateral atrophy of the optic nerves, it has seemed to me that the course of these mutually corresponding cases should be given prominence as a particular disease-entity, and that the causation of this peculiar syndrome should be sought for.

Miss F. K., aged thirty-seven years, was brought to the clinic on April 8, 1896. She was said to have been deformed since her tenth year, and for some eight years had swayed and staggered in walking. She had formerly been a tailoress, but had been unable to work for several years on account of weakness of the eyes and hands. Some four months prior to her admission at the clinic, and following a cough and coryza, the limpid fluid already mentioned began to trickle from her left nostril. This nasal discharge persisted uninterruptedly day and night. When she was in the dorsal position the fluid ran into the throat and was swallowed.

[1] From the Clinic of Diseases of the Ear and Throat, University of Rostock.

The patient was small and thin, of slender build, and pale complexion. She had a considerable kyphoskoliosis. Her mental capacity appeared to be slight. She smiled a good deal without apparent occasion, but gave clear and correct replies to simple questions. For the most part she sat quietly, and held a handkerchief or a glass under her dripping nose. She could not walk unaided, and when left unsupported while walking, she lurched toward the nearest object in order to sustain herself. Her movements were not ataxic ; it appeared to be only a question of great weakness in her legs.

The limpid fluid dripped continually from the left nostril. This was collected at various times and amounted to about 15 *ccm* per hour. Professor Nasse's examination showed solid constituents to be 1.18 per cent., ashes, 0.75 per cent. ; the loss by heating .43 per cent., was probably albumin. Mucin was not demonstrated to a certainty, owing to the slight amount of the fluid tested. The ashes contained a large percentage of sodium chloride. In the right side of the nose nothing abnormal was discovered. In the left side there was a considerable hypertrophy of the anterior extremity of the middle turbinated bone.

With regard to the eyes, there was a slight prominence of the bulb, globe and rotatory nystagmus. The right pupil was of normal width, the left was somewhat dilated. The right pupil reacted well to light, the left hardly at all to direct, but well to consensual light. Slight insufficiency of both interni existed. In the right eye vision was $\frac{5}{9}$, but with the left, the patient could count fingers only when they were held close in front of the eye. Professor Berlin established the presence of pronounced bilateral atrophy of the optic nerve.

The temperature was normal, pulse 90–100, respiration 20.

The patient could be kept under observation for a short time only, so that justice could not be done to the case ; many points, therefore, concerning which information was desirable were not investigated, because we were not conversant with the literature of similar cases. It is certain that there was no inflammation of the thyroid gland, for we had been attentive to this possibility ; the prominence of the bulbus oculi had for a moment suggested Basedow's disease. We could not give an opinion as to whether or not there was thyroid atrophy. Acromegaly was out of the question, because the hands and feet were very finely formed. The sensibility of the skin and patellar reflexes were tested, and,

to the best of my recollection, were found normal; in the clinical history, a mention under this head is wanting.

Unfortunately our observations could not be completed. In reply to my request to bring the patient to us, the father wrote that she died September 5th, four and a half months after the period of observation. The nasal discharge had increased toward the last, and cough and pulmonary râles had set in. There was no autopsy.

The origin of the fluid remains enigmatical. All that could be seen was that it dripped from the middle turbinated bone. The quality and quantity underwent no change, even after removal of the turbinate hypertrophy. A microscopical examination of the excised tissue showed only ordinary hypertrophy. Puncture of the left antrum through the inferior meatus brought forth no fluid.

According to its composition the nasal fluid could have been a thin, catarrhal secretion—such as occurs in vasomotor coryza,—as well as cerebro-spinal fluid. In the chapter on "Disturbances of the Olfactory Function, of the Sensibility and the Secretion of the Nose," in Heymann's *Handbook of Laryngology and Rhinology*, I have thoroughly discussed the various kinds of watery discharge from the nose—such as are comprised under the term hydrorrhœa nasalis; and will therefore not enter further into this subject.

It seems to me that I came across the only possible explanation of this case in reading a dissertation by Gutsche (*vide infra*). The latter described a tumor which had broken into the sphenoidal sinus. The patient, aged thirty-four years, and apparently in perfect health, experienced for two months before his death a constant dripping of a watery fluid from the left nostril, which persisted until his death. In the recumbent position the fluid ran into the throat. About 250 *ccm* were secreted daily. Death was due to meningitis. The rupture of the tumor into the sphenoidal sinus had paved the way for the escape of the cerebro-spinal fluid. Unfortunately an ophthalmoscopic examination was not made; but in the autopsy the left optic nerve was found compressed by the tumor, and of a grayish hue, while the

right nerve was gray in a small area. Now it seems to me that in my case as well, there is no more approximate solution at hand than the assumption of the extension of a tumor of the hypophysis in the sphenoidal sinus, with escape of the cerebro-spinal fluid; for thereby we may at once comprehend the bilateral atrophy of the optic nerve, which is a frequent symptom of tumors of the hypophysis. The peculiar personality of the patient, and the weakness of the limbs are symptoms which are likewise not infrequent in tumors in that locality. In a survey of the literature, I find in Schuster's Inaugural Dissertation on tumors of the brain (Münich, 1886), a description of a case of sarcoma of the hypophysis with the following remark: "The few days during which our patient was free from pain coincided probably with the escape of fluid through the corroded place in the sphenoid bone." Other accounts of hypophysis-tumors, so far as they are accessible to me, nowhere contain any mention of hydrorrhœa nasalis. However, I found in literature, along with Gutsche's case already quoted, no fewer than eight observations of nasal hydrorrhœa in connection with atrophy of the optic nerves and other symptoms which occur in tumors of the hypophysis. An autopsy was made in only one of these cases (Baxter, *vide infra*), which was limited to the brain, and at which the cause of death was not discovered. It is there stated that there was nothing abnormal in the accessory cavities of the nose. Nothing is said concerning the hypophysis. This negative result of an incomplete autopsy does not weigh very heavily against the positive finding of Gutsche; but it shows that the most careful investigation of every similar case is particularly desirable in the future. I have found in literature the following eight cases which likewise show the complex of symptoms just described.

1. BAXTER. A case of paroxysmal clonic spasm of the left rectus abdominis, with symptoms pointing to the existence of gross intracranial disease. *Brain*, vol. iv., p. 525, (Jan., 1882).

Female, aged thirty-five. At first headache, then a watery dis-

charge from the right nostril, tinged at times with blood. The pain was centred in the right half of the nose and radiated over the temple. On both sides optic neuritis with limitation of the field of vision. Attacks of clonic spasm of the left rectus abdominis. Three years after the commencement of the disease convulsions set in, death following in coma. Autopsy (*v. supra*).

2. GUTSCHE. Zur Pathogenese der Hypophysistumoren und über den nasalen Abfluss sowie das Verhalten des Liquor cerebrospinalis bei einer Struma pituitaria.

For report see the text.

3. HARDY and WOOD. Two cases of nasal hydrorrhœa. *New York Medical Journal*, vol. ii., Sept. 6, 1890, p. 264. Case 1.

Female, age forty-three. Sunstroke in July, 1881. Since that time attacks of violent pain in the vertex of the head. Since September, 1881, intermittent watery discharge from the nose, at first with redness of the conjunctiva and severe lachrymation. During the past two and a half years, there had been a daily nasal discharge, which began when the patient rose in the morning and persisted for three to four hours, being present but rarely at night. Dropping from both nostrils. In October, 1898, the acuteness of vision diminished, and in November there was a transitory central scotoma. Slight swelling of the turbinated bodies. Movements of eye and pupil normal, symmetrical narrowing of visual field, great pallor of the right papilla, and on both sides an atrophic segment of a circle at the lower, posterior margin of the papilla. Portions of the middle turbinated bone were removed, and belladonna and oxide of zinc were given internally, but no permanent benefit was obtained.

4. LEBER. Graefe's *Archiv für Ophthalmologie*, Bd. 29, Th. i., p. 273.

Girl with congenital hydrocephalus, physical development very backward, mental normal. From her fifteenth year disturbed vision, attacks of vertigo, epilepsy, and headache. Bilateral optic-nerve atrophy. Five years later watery discharge from left nostril,

of from 4 to 22 *ccm* hourly. Density, 1008; reaction, alkaline; contained sodium and potassium chlorides, traces of sulphuric acid, and a proteid substance. Later, discharge from right nostril.

5. NETTLESHIP. *Ophthal. Rev.*, January, 1883, p. 1.

Female, twenty-five years, headache (which came on suddenly), weariness, verbal amnesia, muscular weakness—especially on left side; later, exophthalmus with diminished vision. Sixteen months afterwards watery discharge from left nostril, which diminished a month later. Atrophy of both optic papillæ with narrowing of visual field, especially laterally.

6. PRIESTLEY SMITH. *Ophthal. Rev.*, 1883, p. 4. Case I.

Male, twenty-eight years. After smallpox, violent headache and vomiting, followed soon by blindness. Headache persisted. Four years later watery discharge from left nostril. Whenever the discharge subsided severe cerebral symptoms set in (increase of headache, somnolence, lethargy). Improvement when flow returned. These attacks were progressively more severe, and at last convulsions set in. Bilateral optic-nerve atrophy. Density of fluid, 1007. Death two years after the appearance of the nasal discharge. No autopsy.

7. PRIESTLEY SMITH, l. c., Case II.

Male, twenty-two years. During his eighteenth year, headache set in, and also (suddenly) an attack in which he lost consciousness and fell forward. Convergent strabismus then appeared. Disturbed consciousness during several months, delirium, headache, vomiting, blindness. Bilateral optic neuritis, with atrophy of nerve later. For fifteen months total paralysis of lower extremities. Two and a half years after the attack, watery discharge from nose, right side. A few months later, polypus on right side, discharge from left side. In twenty-four hours 300–350 *ccm*. If the flow ceased, patient felt a pain between the shoulders, which radiated toward the base of the brain.

8. MACKENZIE WALLACE. A case of atrophy of the optic nerves with dropping of watery fluid from the left

nostril. "Transact. iii., Session Intercolonial Medical Congress. Sydney, June, 1893. Review in *Centralbl. f. Laryngologie*, Bd. xi., p. 67.

Male, aged twenty. Suffered from blindness and continual watery discharge from the left nostril. Disease had begun three years earlier with diminution of vision, marked headache, and certain seizures during which patient fell as if in a swoon. A year later there began a discharge from the nose, and simultaneously there was a cessation of the seizures, which moreover did not return. Nothing abnormal was demonstrable in the nose or its sinuses. The amount of fluid was 30 *ccm* hourly. Density, 1006. Chlorides and traces of sulphates and potassium present.

The *fundamental features* of the disease, so far as they can be recognized from the nine recorded cases, appear from the following data:

Sex; four males, five females. Age, 20–43, on average, 29 years. Amount of fluid in twenty-four hours, 250–720 *ccm.* Density, average, 1006.

Brain symptoms: headache, in six cases; vomiting, twice. Disturbances of sensorium, five times. Verbal amnesia, once. Weakness of all extremities, once; of one side, once; of both legs, once. General convulsions, in three cases; local spasms, once.

Ocular changes: bulbi prominent, twice; strabismus, twice. Rotatory nystagmus, once. Bilateral atrophy of optic nerves (partly with limitation of visual field), eight times clinically, and once anatomically established.

The disease began with cerebral symptoms six times, with eye symptoms twice, with nasal discharge once.

It was stated in three cases that the cerebral symptoms increased with cessation of the nasal discharge, and decreased when the flow was re-established.

Termination: in five cases unknown, four deaths, recovery once.

Duration of disease in fatal cases, from two months to eight years: average, four years and three months.

Duration of nasal discharge in fatal cases, from two months to two years; average, eleven months.

TWO CASES OF PACHYMENINGITIS EXTERNA AND EXTRADURAL ABSCESS OCCURRING IN ACUTE MASTOID DISEASE.[1]

By Dr. HERMANN PREYSING (Assistant).

Translated by Dr. E. Preble, New York.

Case 1.—H., teacher, aged seventy years, visited the clinic December 29, 1897, on account of severe pain within and behind the right ear, which symptom had been present for two weeks.

For the space of a few days during this period the ear was said to have suppurated, but this symptom had again subsided. Both ears had originally been healthy; patient could not give any particular occasion for the present affection.

The patient was vigorous for a man of his years; there was nothing abnormal to be found in the thoracic and abdominal organs, and he was free from fever. The posterior border of the right mastoid process was sensitive to pressure, but was not distinctly swollen. The membrana tympani of the same side was a little reddened and convex, and the outlines of the malleus were indistinct. A swelling of the postero-superior wall of the auditory meatus was apparent.

Paracentesis, made immediately, revealed a serous collection in the tympanum, but without a trace of pus.

During the following night (December 29th) the patient, whose temperature was still normal, experienced very severe pain which he referred particularly to the anterior aspect of the vertex and to the depths of the right ear. The lower half of the right antrum pit was on the succeeding day still more tender to pressure, and there was pus in the auditory meatus, while the swelling in the wall of the latter had increased. On this account the right mastoid process was at once chiselled open.

[1] From the clinic of Diseases of the Ear and Throat, University of Rostock.

The periosteum was found to be unusually thickened, and the bone was strikingly yellow. In the mastoid fossa numerous apertures of dilated vessels were visible. During the procedure of chiselling and removing the posterior wall of the auditory meatus, an abscess was nowhere encountered. The bony tissue was found to be compact, and was discolored yellow in its deeper layers. The hemorrhage from the bleeding points increased as the bone was more deeply penetrated. In the vicinity of the region of the sinus were a number of small cells filled with granulations, and surrounded by carious bone; in these granulations were embedded small, yellow nodules of pinhead size. The posterior cerebral fossa was slightly perforated by further chiselling. Immediately pus in jets issued from the small opening. The opening was enlarged, and the sinus found to be covered with granulations and pulsating actively. As collapse set in, no further effort was made to lay bare the antrum.

On the afternoon of the same day (December 30th) patient's temperature was normal, he was cheerful and good-humored, while next morning he had toothache in all the lower teeth. Dressings were changed, and no sign of retention found. The tampon from the meatus was somewhat moistened by pus along its middle, but the end which had been in contact with the membrane was dry.

On January 1, 1898, condition was good; on the following day, however, pain reappeared, and on this account a furunculous spot at the posterior upper wall of the meatus was incised.

On January 3d the pain again increased, and redness and œdema appeared in the vicinity of the operation-wound.

On January 7th, eight days after the first operation—the patient was anæsthetized—the old operation-wound was enlarged, and certain cells which were filled with pale granulations, and situated toward the apex, were removed with chisel and curette. The small, yellow nodules were still to be seen in the granulations (anatomical investigation showed ordinary granulation-tissue rich in vessels). The sinus was covered with apparently healthy granulations. It was further laid open by the removal of carious bone, and showed throughout a granulated surface. Pulsation was no longer visible. As there was no fever, and as the tympanum contained no pus, there was no occasion to open the antrum.

After the second operation the pain vanished, the general con-

dition improved, the ear remained dry, and after six weeks of treatment the patient was discharged in the best of health on February 9th. The fundus oculi was normal throughout; in both eyes commencing cataract to be seen (Dr. W. Schmidt).

CASE 2.—F. L., aged five years, was brought to the clinic December 23, 1897. The only history obtainable was that during the previous summer the child had an eruption of crusts and scabs, which occupied the entire surface and lasted for a week. Eight days before admission the patient was said to have had fever, headache, and earache on the right side. Three days before admission her parents noticed swelling and tenderness in the region behind the right ear (the ears had never suppurated).

The child was in poor condition, was badly nourished, with cold, pallid skin; pulse irregular and weak (frequency, 64); temperature in the rectum, 37.7°; mind apparently clear. The surface of the entire right mastoid process was infiltrated; there was no swelling in the jugular region. The right membrana tympani was reddened and convex.

Paracentesis of the right membrane was performed at once with evacuation of a serous exudate in slight quantity (upon the next morning there was pus in the meatus).

As the general condition showed no improvement, the operation of chiselling into the right mastoid process was performed upon the day following the paracentesis. A perpendicular incision was made at the highest level of the infiltration about 1 *cm* behind the concha, and carried down to the bone. An angular incision was then made to the rear. When the periosteum, easily lifted off, was pushed backward, pus gushed forth in abundance from the vicinity of the mastoid process; pulsating blood was mingled with it. The first stroke of the chisel at this spot laid bare some blackish-red granulations. The cranial fossa was laid open in all directions with the bone-forceps exclusively. The bone was softened and hyperæmic in places. No suppuration or granulations. The outer surface of the bone showed small blood-points, and was discolored gray in a high degree. The affected region in the dura was 1 *cm* in diameter, sharply defined, projecting about 2 *mm* above the surrounding level and having the appearance of foul granulations; its centre corresponded nearly to the exit of the mastoid emissary. The surrounding dura was dirty-blue in color and hyperæmic. The entire surface laid open was about 3 *cm* in diameter. In probing the granulated area there was felt

at a slight depth the same resilient resistance and the same cerebral pulsation as on the neighboring dura, where no granulations were present. The pulse during the operation was stronger and more frequent than before (about 76). The antrum was not examined, because the tympanum had contained only serum, and because the diseased bone did not extend sufficiently in that direction.

After the operation paralysis of the abducens was noticed on the right side; the pupils were wide but of the same size, and reacted promptly.

On the day after the operation (December 25th) the general condition was improved. The child coughed a good deal, but there was nothing particular to note in the lungs. The patellar reflexes were present, and there was no paralysis apart from that of the abducens.

On the third day after the operation (December 27th) the dressings were changed for the first time. The wound looked well, and pus was nowhere visible. The granulating spot on the dura was smaller; the granulations themselves were flatter.

On the fourth day after the operation the child was unusually cheerful; she laughed and took nourishment. A slight but distinct protrusion of the bulbus oculi was associated with the abducens paralysis. It was possible to examine the fundus oculi for the first time, and a marked choked disk was found on both sides, especially the right.

On the seventh day after the operation the three corners of the wound were closed with secondary sutures, leaving a small space in the middle.

Recovery was thenceforth uniform. On January 30th (thirty-seven days after the operation) patient was discharged cured. The wound was completely closed, and the osseous defect covered with healthy skin and scar-tissue. Over the defect a distinct pulsation could still be felt. The membrana tympani was closed and the malleus recognizable. Examination of fundus oculi on the day of discharge (Dr. W. Schmidt) showed "on both sides distinct distension and tortuosity of the veins, diminution of vessels in the margin of the papilla, optic disk somewhat protuberant." The abducens paralysis had disappeared.

Remarks.

There existed in both cases pachymeningitis externa and

extradural abscess, in consequence of very brief disease of the mastoid process, which had not led to noteworthy destruction. In both cases the tympanum contained serum, and connection of the disease with the antrum was not demonstrated. The first thought is that these cases might have been examples of bone infection not originating in the mucoso-periosteal lining of the air-cells. This view finds a certain degree of support in the case of the teacher (Case 1) on account of the presence of a probably relapsing furunculosis in the meatus. An infection of bone from this latter source is at least possible. The unusual condition of the bone in this case illustrated that but little known disease—**acute inflammation of the compact osseous portion of the mastoid process.**

TWO CASES OF MASTOID DISEASE OF AN UNCOMMON CHARACTER.

By ROBERT LEWIS, Jr., M.D., New York.

Case 1.—**Cholesteatoma, Complicating a Bezold's Mastoiditis, successfully operated upon by the Schwartze-Stacke Method.**

The patient, a female, twenty-five years of age. consulted Dr. A. H. Buck on the 28th of February, 1898, and gave the following history :

When three years of age she had an attack of acute catarrhal otitis media independent of any of the exanthemata or other acute disease. The condition lapsed into a chronic purulent otitis media, the discharge being allowed to go on for three years before the patient received any treatment from the hands of the aurist. Then for a year she remained under treatment, but, according to her belief, received no benefit. On this account, and because she suffered so much at each visit of the physician, treatment was discontinued. In time the discharge became less constant, and for some years back it had apparently ceased for a time, to be followed by pain and a renewal of the discharge, with relief from pain in a few days. Then, after another period of several weeks or months, the discharge would again cease.

When seven years of age, the patient swallowed a pin, and in her fourteenth year an abscess appeared about an inch below the tip of the mastoid process. This ruptured, and in the discharge a rusty pin was found. The abscess healed after a time.

On the 3d of December, 1897, she "took cold," as a result of which she experienced severe pain in the ear, as also pains throughout her body. A week later an abscess appeared at the site of the old pin abscess and ruptured. The discharge from this was very offensive and most profuse. In the vicinity of the mastoid, and radiating upwards and forwards, the pain was very intense.

When Dr. Buck first saw the case, on the 28th of February, 1898, there was some tenderness on pressure over the mastoid, and about an inch below the tip of the mastoid process was a small pouting ulcer, from which exuded a thin serous pus. Upon exploration with a probe, the instrument passed upwards towards the tip and into the mastoid for a distance of over two inches. The external auditory canal was much inflamed and stenosed; an ulcer existed on its posterior wall, through which a probe passed directly into the mastoid process.

Dr. Buck kindly referred the case to me. I operated on the 4th of March. The cortex was thin and easily removed; and beneath it, and occupying the whole mastoid process, was a large **cholesteatoma** as large as a large-sized olive. When this had been removed, an opening was found extending through the digastric groove and communicating with the ulcer on the neck. This was opened throughout its entire length and thoroughly scraped.

The mastoid process was found to be converted into a single large cavity, all the partitions being broken down. A spot, which measured about two by three millimetres, was eroded in the floor of the middle cerebral fossa, and a similar spot existed in the bony wall of the sigmoid sinus. The ossicles and membrana tympani had been destroyed. It was necessary for me to remove the entire posterior and superior bony wall of the external auditory canal. After removing all suspicious bone, I was about to make the Panse skin flaps, when my patient showed signs of heart failure. The attempt to make these flaps was therefore abandoned. Simple dressings were applied and the patient was placed in bed. I was surprised and gratified to find that no injury had been done to the facial nerve.

During the next week the patient improved sufficiently to enable me to finish the operation. On the 14th of March she was anæsthetized; the whole surface of the mastoid cavity was curetted, nothing but granulation-tissue being removed. The membranous external auditory canal was divided into a posterior and an anterior flap. The latter, of course, I did not disturb; the posterior one I turned at right angles and united with sutures to the posterior flap of the mastoid wound, and then united the edges of the mastoid incision. Iodoform gauze was inserted into the large cavity made up of the external auditory canal, middle ear, and mastoid cavity. On my patient's recovery from the

effects of the ether, I found that I had not been so fortunate this time in escaping the facial nerve: the bony canal must have been exposed, and in my efforts to scrape away the granulations I must have wounded the nerve.

Since the operation the patient's general health has rapidly improved; she has been free from pain, and the paralysis is very slowly improving. I have hopes, as also has Dr. Auzal, under whose care she now is for the paralysis, that it will eventually disappear. The cavity has become lined with epidermis throughout. I had the usual trouble with the granulations, which sprang up from the walls of this cavity; they had to be cauterized and curetted, and it seemed as if at times no headway could be made against them. I found that aristol, dermatol, and nosophen seemed to irritate the skin granulations; at all events, on one occasion, I resorted to finely powdered boric acid, and found on the next visit a marked improvement in the appearance of the skin surface. At the end of one week, after the use of the boric acid had been begun, the skin had grown over two thirds of its whole surface. In another similar case, which I had under my care a few years ago, I found after trying many remedies and after many weeks of treatment, that there was one small spot which resisted all attempts to coax it to skin over, and it was not until I used an ointment of ichthyol that I succeeded in causing it to become permanently healed.

CASE 2.—**Tuberculous Extra-dural Abscess. Operation. Death.**

The patient, a female, twenty-four years of age, gave me the following history:

From the time she was four years of age, she had had (following an attack of measles) an almost constant discharge from the left ear, at times profuse, then again scanty. During the past few months, the discharge has been very offensive and profuse. Three weeks ago, she began to suffer from a dull aching pain in the temporal region, which has steadily grown worse, and has extended so as to involve almost the entire left side of the head. At times it has been so unbearable that her physician could give her relief only by the administration of morphine. Two weeks ago, a paralysis of the facial nerve occurred.

On examining the ear, I found the canal to be filled with a very offensive and cheesy discharge. On cleansing the ear as thoroughly

as possible, the inner third was seen to be filled with a polypus. This was removed under cocaine anæsthesia. The membrana tympani and the ossicles were found to be totally destroyed, and dead bone was readily felt in the epitympanic space, and in the aditus ad antrum.

An operation was advised as imperative, but to this the patient would not submit. She was accordingly made as comfortable as possible with anodynes.

Twelve days later I was again requested to call, and found her suffering intensely and in a very weak state. An operation was again advised as the only possible means of affording relief.

The next day the patient gave her consent. The mastoid was opened in the usual way ; on removal of the cortex, very offensive cheesy masses were encountered ; these extended into the antrum and the epitympanic space. All suspicious bone, including the tip of the mastoid process and the upper posterior wall of the external auditory canal, was removed, and the exuberant granulations in the middle ear were destroyed. Exploration with the probe revealed the existence of an opening in the tympanic roof, and through this the instrument was passed a distance of over an inch into the middle cerebral fossa. The original incision was then extended in a vertical direction upwards, and with a half-inch trephine (its vertical pin being placed about one inch above the middle of the external auditory canal). I removed a button of bone. Then with the rongeur forceps, I extended this opening downwards and backwards as far as the opening which I had made in the cortex of the mastoid process. At the same time I cut through the tympanic roof. By this means free access was obtained to the superior surface of the petrous portion of the temporal bone. When I lifted up the dura I encountered an abscess of the same cheesy consistency as that which I had found in the mastoid process. It extended inward along the superior surface and close to the posterior border of the petrous portion of the temporal bone. (The contents of the abscess were examined the next day by Doctor James Ewing, who reported the presence of numerous tubercle bacilli.) The abscess wall was thoroughly scraped, and as no further sinuses were found, and the dura seemed to be firm and non-inflamed, although thickened, no further operative interference was thought to be necessary. No sutures were used ; the wound was packed with iodoform gauze.

On the following day, the patient was found to be in a comfort-

able condition and free from pain. Forty-eight hours later, a tendency to drowsiness became manifest. It was necessary to awaken her whenever it was thought best to administer nourishment, or whenever it was desired to obtain an answer to a question. This drowsiness rapidly increased, so that, on the third day following the operation, it was decided to search for a possible brain abscess. Her temperature at the time stood at 100.8 F.; there had been no chills.

At five, P.M., on the 7th of January, three days after the first operation, she was again placed on the operating table. After consultation, we decided that it was preferable to use ether as an anæsthetic. The dressings were removed, and I was about to make a further exploration of the wound, which was clean and healthy, when the patient suddenly stopped breathing. The head was at once lowered, and artificial respiration was employed. In a few moments the patient gave a sigh and respired, but only this one voluntary effort was made. Strychnine, in combination with atropine, was administered hypodermatically, and oxygen inhalations were also employed. The faradic current was applied over the pneumogastric nerve. But the moment artificial respiration was discontinued, the patient became more and more cyanotic, and the heart more and more feeble. The cyanosis would immediately disappear and the heart-beats grow strong, as soon as artificial respiration was resumed. This was continued for about two hours without a change. The fact that the pupils were widely dilated made it evident that a source of increased intracranial pressure existed, and accordingly I concluded that no harm would result from an exploration of the brain, and possibly I might succeed by this means in reaching the source of pressure. I therefore incised the dura and introduced an aspirating needle in various directions into the brain tissue, which seemed to be somewhat softened, but I failed to discover any pus. Some fluid, evidently from the lateral venticles, was removed. This was followed by a contraction of the patient's pupils to normal proportions, and also by spontaneous breathing, which lasted, however, only for about four minutes. The rate of the spontaneous respirations was about five per minute; then the breathing again ceased, and artificial respiration was again resumed.

I was inclined to explore the cerebellum, but as this would make necessary further incisions and trephining, I desisted. About 10.15, P.M., her heart commenced to grow weak, and

in another fifteen minutes it stopped beating. The patient was kept alive for nearly five hours by means of artificial respiration.

Unfortunately an autopsy was not allowed. Since the operation, I have wondered whether death might not have been due directly to the ether narcosis. It was my first impulse, when I began to operate in this case, to use chloroform instead of ether, but finally decided against the use of the former.

THE ONSET OF INHERITED SYPHILITIC DEAFNESS.

By URBAN PRITCHARD and ARTHUR CHEATLE.

THE modes of onset in this disease receive but slight description by authors, yet on careful investigation into the history of each case, interesting facts may be elicited which we venture to think are of importance not only in rendering classification possible, but also in helping to throw some light on the pathological process.

Broadly speaking the modes of onset may be divided into two main groups:

(i.) Without giddiness.

(ii.) With giddiness.

The first is certainly the more usual; the history being that deafness came on gradually, first in one ear, the other, sooner or later, following suit without giddiness, the eye symptoms closely preceding the aural. As a rule, when the patient presents himself, other signs of inherited syphilis (teeth, eyes, etc.) are well marked, so rendering the diagnosis perfectly easy; but occasionally these other signs are but slight, or even altogether absent, the diagnosis resting on an insidious internal-ear deafness coming on between the ages of eight and twenty-five years, which history we think is pathognomonic of the disease, all other possible causes having been excluded. The eye symptoms do not always precede those of the ear, for we meet with cases where the reverse has occurred; this reversal of the eye and ear symptoms must always be present in one's mind if mistakes in diagnosis are to be avoided.

With regard to the pathology of this group: a more or less slow process must be present in the labyrinth, which process does not affect the equilibration-portion, being confined entirely to the purely auditory portion of the nerve and its terminals. A chronic ostitis has been described as occurring in inherited syphilis, leading to the gradual and more or less complete occlusion of the cavities of the internal auditory meatus and bony labyrinth; such a process would seem to account for the symptoms. The symptoms closely resemble those which occur, in one form at all events, of labyrinthine disease due to tertiary acquired syphilis; and Politzer states, in reference to this acquired tertiary disease, that "recent investigations show, without a doubt, that in the old cases an osseous growth from the periosteum takes place owing to the chronic inflammation of the lining of the labyrinth."

It may be that the cases in group 1 have identically the same pathology as in the tertiary acquired form—in other words, the disease is a tertiary form occurring in inherited syphilis. That inherited syphilis may take on a typical tertiary form, as seen in the acquired form, is amply shown by the ulceration of the throat, which is not unfrequently seen in children suffering with the inherited form.

The second group, according to our experience, is decidedly uncommon. Politzer quotes Kipp, who described cases combined with parenchymatous keratitis and iritis in which the symptoms were sudden deafness, vertigo, disturbances of equilibrium, subjective noises, naso-pharyngeal catarrh, and sometimes also catarrh of the middle ear. The following cases illustrate this group; it will be seen that the onset may be acute, subacute, or chronic:

Case 1.—M. M., a boy, aged fifteen years, was brought on account of deafness in the right ear on September 16, 1896; the history being that six weeks previously he had been suddenly attacked with severe giddiness and vomiting, the former lasting a week, the latter two days. On the third day deafness was noticed in the right ear, and this deafness had remained absolute ever since. The father was doubtful as to whether he had had

syphilis. The patient was the eldest of three; he had suffered with "bad eyes" a short time previously; but this trouble was stated by an eminent ophthalmic surgeon to have been more of an ordinary phlyctenular than of a syphilitic nature. For four or five years the boy had suffered with general enlargement of lymphatic glands, especially of those in the neck, for which he had undergone various treatments without much benefit.

A 15-inch watch was heard normally on the left side, but not at all on the right.

The tuning-fork tests demonstrated internal-ear deafness in the affected side.

Blistering behind the ear, and a mixture containing pot. iod. and arsenic, were ordered.

He was seen periodically during the following three months; no real improvement occurred.

On January 13, 1897, ulceration and swelling of the left tonsil and posterior faucial pillar being found, mercury and pot. iod. with a nitrate of silver paint and Condy's Fluid gargle were ordered. Under this treatment the throat rapidly cleared up, and the general enlargement of the glands greatly diminished.

This mode of onset is exceedingly rare in the inherited but comparatively common in the secondary stage of the acquired form. It resembles what may be called a fulminating Ménière's attack, and can best be accounted for by a sudden and great increase of tension affecting the whole of the labyrinth, and destroying at once the terminals of the labyrinthine nerve endings. An exudation identical with that which occurs in the eye seems to us to be the most probable explanation.

Case 2.—E. D., male, aged twenty-eight, presented himself on account of extreme deafness; the history being that at the age of eighteen years the deafness had become complete in two months during marked attacks of giddiness.

Signs of old interstitial keratitis were present in each eye; and the left upper central incisor was notched.

In this case the symptoms were those of subacute Ménière's disease; an exudation being perhaps present which was not at first of sufficient severity to destroy at once the labyrinthine nerve endings, but ultimately, either by the constantly increased tension, or by changes in the effusion itself, producing profound alterations.

Case 3.—A. G., a boy aged eleven years, was first seen on

December 14, 1896. Deafness in both ears was first noticed in the preceding August, associated with attacks of headache and giddiness which were worse on getting up in the morning. Occasionally vomiting occurred after the attacks. His mother had often seen him staggering in his walk towards the left side. Humming, "like an engine at work" was complained of in the right ear. When giddy he sometimes fell forwards, striking his nose or forehead, the ground appearing to rise up and strike him; objects round him appeared to be moving towards one side or the other, most frequently from left to right. He had had two or three attacks during the preceding month.

His mother had never any miscarriages or stillbirths. The patient was the second of four children, the other three being perfectly healthy. No symptoms of disease in infancy. On examination he was a bright healthy-looking boy, relating his symptoms quite accurately. He had never had "bad eyes" and there was no sign of inherited-syphilis beyond very slight pegging of the left central incisor tooth.

The membrane appeared somewhat depressed. Nose and naso-pharynx normal.

A two-foot watch could not be heard on the right side and only on touch on the left.

Tuneing-fork tests demonstrated marked internal-ear trouble.

Giddiness could be elicited by turning the head sharply to the left. Blistering behind each ear alternately and dilute hydrobromic acid in half-drachm doses three times a day were ordered.

December 24, 1896.—One giddy attack during the week. The left ear showed slight improvement, the watch being heard one inch instead of on touch.

December 31*st.*—One giddy attack during the week.

February 11, 1897.—Giddiness has ceased, but patient more deaf.

March 8*th.*—No giddiness, but very deaf, shouting being necessary.

April 8*th.*—Blistering has been kept up all this time. Ordinary loud conversation heard at one foot on the left side, not at all on the right.

May 13*th.*—Keratitis present for the first time, so clearing up the true nature of the case. Blistering still.

April 21, 1898.—Came up for examination after having been in the country for the last five months. Blistering has been con-

tinued up to a month previously. The left ear had markedly improved, low conversation being heard at two feet, the watch at two inches. The right side: shouting heard close to auricle, watch not heard.

Slight occasional vertigo complained of. The active eye trouble ceased. Milder counter-irritation behind ears ordered.

This is an exceedingly interesting case from several points of view. The ear trouble preceded that of the eye by one year and nine months. The only sign of inherited syphilis was the slight pegging of the central incisor. The onset resembled a case of chronic Ménière's disease, the vertiginous attacks extending over a period of one year and four months, the deafness not then being absolute. Blistering certainly produced improvement, arresting the trouble in the right ear, while marked improvement occurred in the left. We think an exudation of a mild degree will most readily account for the trouble.

With regard to the theory of an exudation into the labyrinth corresponding to that which occurs in iritis, Politzer states, in reference to recent labyrinthine affections in acquired syphilis, that it has not been proved that there is a plastic exudation as in iritis, although he quotes a case recorded by Moos (*Virch. Arch.*, vol. lxix., p. 313), where a syphilitic man died who had suffered with intense subjective noises, attacks of vertigo, and later on with considerable deafness, death occurring a year and a half after the onset. At the post-mortem examination the following condition of the labyrinth was found. "Thickening of the periosteum of the vestibule, the foot plate of the stapes raised and immovable. The connective tissue between the membranous and the osseous labyrinth infiltrated with small cells and hyperplastic material. Corti's arches and cells especially considerably infiltrated, the Zona pectinata and the periosteum of the lamina spiralis ossea less strongly infiltrated; the ampullæ and the semicircular canals were alike infiltrated; the auditory nerve normal." Such a condition, we venture to think, points strongly to there having been a plastic exudation corresponding to that which takes place in the iris.

The last case we relate has very much the same history as Moos's, although one is inherited and the other acquired syphilis.

To sum up, then, there are two main forms of onset in inherited syphilitic deafness:

(i.) *Without giddiness*, which runs a subacute or chronic course in which we think the trouble is limited to the auditory nerve and its terminals, leaving the equilibration mechanism intact, and in which a periostitic or ostitic thickening takes place, this condition having its counterpart in one form of the tertiary acquired.

(ii.) *With giddiness*, which may run an acute, subacute, or chronic course; involving the whole of the labyrinthine nerve endings, in which increase of tension due to an exudation, as in the eye, will best account for the symptoms. The resulting deafness being due: in the acute form to an immediate destruction of the labyrinthine nerve endings by pressure alone; in the subacute and chronic cases to a constantly recurring increase of tension and to changes in the exudation itself acting on the labyrinthine nerve endings, this second group having its counterpart in the form seen in the secondary acquired.

THE MOST IMPORTANT CASES OF MIDDLE-EAR SUPPURATION TREATED IN THE MILITARY HOSPITAL AT WARSAW IN THE YEAR 1896.

By Dr. TH. HEIMAN, Warsaw, Russia.

Translated and Abridged by Dr. Edwin M. Cox, New York.

THE cases described in this paper have been drawn from the Warsaw garrison, as well as from several other localities. The proportion of fatal cases has been rather high, and in many of the cases the ear disease was secondary to some other trouble. I shall content myself with describing some of the more interesting and typical cases which I have had the opportunity to observe. I shall add a few critical remarks.

Case I.—**Acute Otitis Media on Left Side—Cerebral Abscess—Operation—Death after Four and one-half Weeks.**

S. P., twenty-five years old, had a left-sided acute inflammation of the middle ear on January 12, 1896, up to which date he had had no such trouble. I saw him in my hospital first on February 3d. There was then a muco-purulent discharge from the ear; the membrana tympani was red, swollen, and had a small perforation; the Eustachian tube was free. Hearing was diminished. The right ear was entirely healthy, and the general condition was satisfactory. On February 18th, the temperature rose suddenly to 39°.2 C., the pulse to 96, and the discharge from the ear was much increased. There was localized pain above the left auricle. After three days all symptoms had abated. On February 28th, the temperature again rose to 38°.5 C., and the patient complained of sharp pains in the ear, and began to look pale, but after two days there was a remission of symptoms. On March 14th, there was again a rise of temperature and some inflammatory in-

filtration in the region of the mastoid process ; and on the following day fluctuation was made out, for which an incision was made down to the bone, and a quantity of thick yellow pus evacuated, after which the temperature fell to normal, and the infiltration disappeared. The wound healed normally and the discharge from the ear stopped. On March 30th, the temperature rose to 38°.3 C., and the pulse was 66 ; there was vomiting and great dizziness, but no headache. The pupils were of normal size and reacted normally to light ; the patient was, however, apathetic and stupid. During the next few days the vomiting was not repeated, but on April 3d there was more vomiting, and constipation became marked ; the pupils were dilated, and reacted only weakly to light ; there was choked disc and increase of the knee-jerk. After twenty-four hours there was some improvement. On April 9th, there was diffuse headache and general weakness, with pallor and apathy. On April 13th, the headache had become a distinctly localized frontal pain, made worse by percussion. The speech was affected, and patient left out words and sentences, and in the sitting or standing position the power of speech was completely lost. On April 18th, temperature was 37°.2, pulse 54. On this day the patient vomited suddenly three times, and was unconscious for ten minutes ; changes in position caused dizziness. Knee reflex almost gone, skin reflexes very weak. Pupils contracted, reaction to light slow. Answers questions satisfactorily, but leaves out some words. Cannot name familiar objects when they are shown to him, but can repeat the names after hearing them. Speaking tires him, and he is drowsy. Moderate paresis of the left facial nerve. April 20th : temperature 36°.6, pulse 62. Names familiar objects incorrectly, *e.g.*, calls sugar bread, etc. Admits that he recognizes objects but cannot name them. Can read print and manuscript.

April 21st, **operation** for supposed abscess of the left temporal lobe of the brain. Chloroform. Curved incision from in front of the ear, over it, and down over the mastoid region. The dura was exposed over a wide area, and was found not to pulsate. Its external surface seemed healthy. Incision in the dura was made in the same direction as the bone opening, and at the depth of 3 *cm* an abscess containing about forty grains of thick yellow pus was found. The walls of this abscess cavity were smooth and it extended downwards. The cavity was treated by packing with iodoform gauze, and the wound sutured at its upper angle. An

incision over the mastoid region showed the bone to be somewhat softened, and the cavities full of granulation tissue, but without pus. After operation the patient was in a semi-unconscious condition. Temperature 37.°6 C., pulse 78. On April 22d, patient can name many objects correctly, and can read print easily. When he cannot name an object he uses circumlocution. Complains of some headache.

April 26th to May 4th, patient remained in a satisfactory condition, and seemed to be progressing favorably.

On May 5th, profuse purulent discharge appeared, coming from the brain surface and the depths of the wound. Patient is again pallid, weak, and somnolent. Some vomiting. The aphasic symptoms again became marked. The pupils became unequally dilated, the left being the narrower.

May 18th, patient was chloroformed, and deep in the temporal lobe an abscess containing about 40 *gm* of pus was evacuated. Patient became steadily worse, and on May 19th died comatose, with high temperature and rapid pulse.

Autopsy, next day, showed purulent infiltration of the pia mater on the left side, with a canal leading into the abscess cavity in the brain substance. The left hemisphere in its lower portion is swollen, the superior longitudinal sinus contains dark fluid blood, and there is much pus in the third temporal convolution. Some prolapse of the brain had occurred, and the cerebral tissue beneath it was softened. Cross-section of the temporal lobe showed an abscess cavity the size of a pigeon's egg, with smooth walls and a delicate capsule. It contained greenish pus. The surrounding brain substance was softened, pale, and œdematous. There was pus in the posterior horn of the lateral ventricle and in the fourth ventricle. The inferior surfaces of the cerebellum and of the pons were also covered with pus.

Lateral sinus empty and its walls thickened. There was a small area of softening in the posterior wall of the sigmoid groove. The middle and internal ear was healthy, the left drum-membrane somewhat thickened. The pus contained streptococci. Nothing abnormal in the other organs.

This case is the ninth case of brain abscess from ear disease seen by the writer, in six of which the diagnosis was

confirmed either by autopsy or operation, and in one of these six the abscess was in the cerebellum.

We may consider the present case one of acute brain abscess from ear disease, with the abscess dating from February 18th, at which date there began the rise of temperature and the increase in the amount of discharge. In making our diagnosis we must also remember the character of the fever, the peculiar pallor of the patient, the varying weakness, with periods of excitement and apathy, to which the patient was subject, and the vomiting, digestive disturbances, and aphasic symptoms. The slowing of the pulse is also of importance. The localization of the abscess might be made out from the fact of ear disease, and from the speech disturbances. The symptoms of brain abscess began at the time when the suppuration in the ear had stopped. Such abscesses following acute inflammation of the middle ear are not common, and therefore such cases are noteworthy. The disturbances of speech were dependent upon the pressure of the pus collection upon the conducting fibres, since operation, and even changes of position affected the ability to speak. The spot of softening in the sigmoid groove, perhaps, furnished the channel for infection from the ear to the cranial cavity. Although this case seemed to be one which should have recovered, the second accumulation of pus and the occurrence of leptomeningitis prevented such a favorable result.

Out of more than one hundred cases of brain abscess from ear disease which have been operated upon, about 50 per cent. have recovered, but unfortunately among this percentage there have been several recurrences with new complications, and in some cases epilepsy, aphasia, or persistent headaches have remained. When we also consider that there is a number of unreported fatal cases, it is evident that the mortality is not a small one.

The manner of opening the abscess is of importance, and the old method of simple puncture is dangerous. The incision should be free, and as v. Bergmann was the first to demonstrate this can be done safely. The cavities should be opened as freely as pus cavities in other parts of the body,

and treated upon the same principles. The danger of hemorrhage in consequence of such a free opening need not be considered, since the tissue about the abscess is usually softened and anæmic, but sometimes a large vessel will be torn. Simple puncture of an abscess does not insure against the occurrence of hemorrhage.

CASE 2.—**Chronic Suppurative Otitis Media—Periostitis of Temporal Bone—Symptoms of Abscess of the Brain—Recovery.**

D. L., twenty-four years old, came to the hospital January 28, 1896, with a chronic right-sided middle-ear suppuration. Examination showed free suppuration, the drum-membrane was reddened and had a small perforation in its lower segment. In the mastoid region there was an incised wound with pale granulations. Hearing in the right ear is much reduced; in the left ear, normal. Patient is pale and weak; no fever; pulse 64. February 3d, severe general headache began, the pupils were contracted, but after a few hours these symptoms disappeared. On February 6th there was a repetition of the headache and some vomiting. Percussion does not increase the headache, and there are no painful spots. Temperature 36°.5, pulse 42. Discharge from the ear has stopped, and the patient felt much better. February 16th, more headache and repeated vomiting. The headache was frontal. During the vomiting the right pupil was markedly dilated; consciousness was entirely retained, and there was no tenderness upon percussion. Changes of position cause dizziness. In the fundus of the eye small hemorrhages are visible, and the papillæ are ill-defined. There is also paralysis of the right facial nerve, increase of the knee reflex, diminution of the skin reflex, and weakness of the left extremities. February 20th: temperature 36°.2, pulse 120. All these symptoms disappeared under the use of tincture of iodine, but in laughing there was some deviation of the right angle of the mouth. On March 7th all the symptoms returned and blepharospasm was added. From March 28th to April 4th patient had headache and vomiting, and part of the time dilated pupils, strabismus, choked disc, and diplopia. April 7th, vision in left eye much diminished. A mixed antisyphilitic treatment was begun, and on April 14th vision in the right eye became decidedly better, and the choked disc had disappeared. Four months later the patient was well but totally blind.

At first this case presented symptoms which seemed to

point to the presence of a large abscess in the temporal lobe, but later such symptoms as hemorrhages into the retina, and the absence of all symptoms at times, made this diagnosis doubtful. The real disease may have been a gumma at the base of the skull in the region of the optic nerves, although acute atrophy of the optic nerves is rare in syphilis. The patient was entirely free from symptoms at times, and at others all were well developed. In cases of brain abscess the patients are never free from some symptoms, but simply have periods of exacerbation and amelioration, and at all times appear very ill. Such cases warn us to be cautious in our diagnosis of brain abscess from ear disease, since there is considerable risk connected with opening the skull, and inflammatory complications are not uncommon. A case much like the one just described occurred in a young officer, twenty-two years old, with a syphilitic history, and a chronic ear suppuration with total destruction of the drum-membrane. He had sudden vomiting, dizziness, and very great pain in the right occipital region, but no fever.

Counter-irritation locally and the internal use of potassium iodide caused all symptoms to disappear promptly. Two days after this all symptoms except vomiting recurred, and I supposed that there was an epidural abscess, but the patient was put upon antisyphilitic treatment, and in a very short time was entirely restored, and remains so.

CASE 3.—**Chronic Suppurative Otitis Media—Epidural Abscess—Septicæmia—Recovery.**

J. N., soldier, aged twenty-two, came to the hospital, December 30, 1895, on account of a left-sided ear suppuration, which had existed for several years. There was a profuse purulent discharge, the drum-membrane had a large, old perforation with callous borders, the mucous membrane of the tympanum was pale, red, and swollen, and the mastoid was tender on palpation. Hearing much reduced on the diseased side. No fever, and general condition good. January 4th there was some fever and headache upon the left side, and an unusual amount of discharge from the ear. There was some rise of temperature from this date until February 26th.

On January 11th there was a well-marked chill, and the headache and tenderness of the mastoid disappeared. Consciousness and muscular action were undisturbed. January 22d, there was pain in the left wrist-joint, and in the left occipital region. Under chloroform a T-shaped incision was made in the mastoid region, and the whole lateral wall of the mastoid from tip to base was chiselled away. The opening reached as far forward as the mastoid antrum, and far enough back to freely expose the lateral sinus. All the bony parts in this region were infiltrated with pus, and from within the cranium there flowed about 20 *gm* of yellow, odorless pus. The dura seemed normal and pulsated at only one spot. A puncture where it did not pulsate brought only blood and cerebro-spinal fluid, and a needle in the sinus also brought only blood. The wound was treated by packing. Two days after operation there was a chill and great general weakness. The wound looked pale, and its edges relaxed.

January 26th, slight chills, but a better general condition. January 29th, very free discharge from the wound, cough, but no interference with motion of head. February 2d, chill, and February 4th, pain in the hip and knee without objective symptoms. Consolidation in the right pulmonary apex.

Between this date and February 27th several joints became inflamed, but did not suppurate; but from the latter date improvement began, both general and local, and by March 29th the wound was entirely healed. The discharge from the ear stopped entirely, and all joint symptoms slowly disappeared.

REMARKS: This case was evidently one of epidural abscess, with septicæmia or septico-pyæmia, but the presence of the abscess was only discovered at the time of operation, and it must be considered as the cause of the general infection since the pain in the left occipital region was present for a long time before the general symptoms. The evacuation of the abscess made the whole course of the disease less severe, but the general infection ran its course. When cases like this one are operated upon, and have, in addition to the local symptoms, signs of general infection, it is a good plan to puncture the lateral sinus, in view of the possible presence of a thrombus which, if found, may necessitate opening the sinus freely. Sometimes there is a thrombus at some other point than the field of operation, and in that case the diag-

nosis may be very obscure. The result of the puncture of the sinus is important from a prognostic point of view. I have become more and more thoroughly convinced that all cases like the one under consideration must be treated as radically as possible, and that if we may hope to save them we must find the focus of infection and remove it. Unfortunately in some cases it is impossible to supply conditions favorable for the cure of a focus of infection in the cranial cavity, and bad results follow. Although it is a fact that in many cases simple chiselling away of the mastoid will relieve the symptoms, we cannot be sure that such a procedure is radical, and it will often prove necessary to open the cranium and expose or even open the lateral sinus. This can be done without much increasing the risk to the patient, and it may prove of great value. There need be no fear of infecting the sinus by puncture. During recent years I have discarded the use of irrigation of the wound at the time of operation, as I have become convinced that in this way the period of healing is shortened. When there is much discharge, however, the dressing must be changed frequently. Partial suture of the wound is also serviceable.

CASE 4.—**Acute Suppurative Otitis Media—Epidural and Temporal Lobe Abscess—Recovery.**

T. N., soldier, twenty-three years old on May 1, 1896, had an acute right-sided middle-ear inflammation. The drum-membrane was reddened, swollen, and perforated in its upper half. The right ear had much diminished hearing. Until May 9th, there was nothing noteworthy in the case. On May 20th, patient began to have pain in the right side of the head, and œdema of the right temporal region. The amount of the discharge was increased and the temperature was 38°.2 C., the pulse 90. A few days later fluctuation was discovered above the auricle and about 25 *gm* of pus evacuated; the bone was denuded of periosteum. The course of the wound was entirely normal until June 14th, when there was sudden and violent headache, dizziness and vomiting. Temperature 38°.8 C., pulse 80. The right pupil was dilated. The symptoms soon disappeared but all recurred in a few days. In the area of denuded bone above the auricle a small spot of softening was found, and **through this a small open-**

ing into the skull was made with a chisel. About 30 *gm* of pus was evacuated, and the dura found to pulsate. The cavity was treated by packing, and the wound partly sutured. June 19th, temperature 39°.9 C., pulse 96, and patient feels well. Profuse purulent discharge. The cavity eventually entirely healed. The discharge from the ear stopped eight days after operation, and after ten days the perforation in the drum could no longer be seen.

REMARKS: In this case there was an epidural abscess in the middle cranial fossa without previous involvement of the mastoid. Although there was no demonstrable connection between the sub-periosteal abscess and the collection in the cranium, the latter was undoubtedly the consequence of the former. The case is a typical one of subdural abscess in which the diagnosis was not difficult, although the sudden cerebral symptoms seemed to indicate a suppurative leptomeningitis. I believe that this would have occurred if the pus focus had not been evacuated in time, and I am furthermore of the opinion that nearly all cases of diffuse meningitis following otitis with a circumscribed lesion, result from such subdural abscesses.

CASE 5.—**Acute Suppurative Otitis Media—Epidural Abscess—Recovery.**

A. S., aged twenty-three, entered hospital May 23, 1896, with a left-sided purulent otitis media of three months' duration.

The discharge was profuse, the drum-membrane perforated, and hearing on the left side much diminished. On May 19th, the discharge increased, there was diffuse headache, and some tenderness on percussion of the mastoid. No fever. On June 1st, the headache was distinctly left-sided, there was some dizziness, and the discharge from the ear continued profuse. Vomiting occurred a few times and the pupils were contracted. June 6th, the mastoid was chiselled away and the cranium opened.

The mastoid cells were full of pus and granulation tissue; the dura looked normal and pulsated. A needle puncture brought out a syringe-full of slightly turbid fluid containing a few pus cells. The pain next day was gone, but it soon returned, and a few days later during the dressing of the wound there was a flow of about 30 *gm* of thick pus from the depths of the wound. The subse-

quent course of the wound was normal, and in six weeks it had entirely healed by granulation, except a small communication with the tympanic cavity, and this too was entirely healed in the course of a few weeks.

REMARKS: The persistent left-sided headache, the transitory tenderness of the mastoid, the simultaneous increase in headache, and the amount of discharge, the vomiting, and the dizziness all pointed toward the existence of an epidural abscess, but this was not in evidence at the time of operation for the collection of pus was probably situated posterior to the opening in the skull, and its escape temporarily blocked by the dura mater. It is also a possibility that in this case we had to deal with an intradural abscess well localized. Such abscesses, however, usually cause a rapid leptomeningitis. In our case the operation was necessary and life-saving.

CASE 6.—**Chronic Suppurative Otitis Media—Septico-Pyæmia—Recovery.**

T. E., twenty-four years old, entered hospital March 24, 1896, with a left-sided middle-ear inflammation which had existed since childhood, but had had an exacerbation of three weeks' duration.

His temperature was 39°.5, pulse 86, and there was severe headache, and tenderness all over the head. The mastoid and region of the jugular vein were tender and swollen, and movements of the head painful. Pupils dilated, reacted to light, consciousness undisturbed. Free discharge from the ear, drum-membrane pale, thickened, and perforated. Next day temperature was somewhat higher.

March 27th, **operation** was done in the usual way upon the mastoid. The posterior and lateral parts of the mastoid and the upper posterior wall of the auditory canal were chiselled away.

The tegmen was sound, and the carious head of the malleus was removed. When the sinus was exposed it seemed abnormally resistent and it was punctured, but only dark fluid blood was withdrawn. During the next few days there was some fever and the patient was occasionally delirious, and during the two weeks following the operation there were several chills. It was not until May 31st that the patient was cured, and at the time he was in a very much emaciated condition.

This case was more one of a general septic infection than anything else. The chills, the irregular rise of temperature, with remissions, the occasional diarrhœa or constipation, etc., all indicated such a condition. The operation does not seem to have had any effect upon the course of the disease, and the patient might have recovered without it, but it was probably of use in lessening the intracranial pressure, and in providing a certain amount of drainage for any infectious material. The case also illustrates the uncertainty of a diagnosis of sinus thrombosis, for all signs pointed towards it, yet it was not discoverable.

CASE 7—**Acute Suppurative Inflammation of the Outer and Middle Ears—Septico-Pyæmia—Recovery.**

D. P., twenty-two years old, admitted to hospital September 2, 1896, with a purulent discharge from the left ear of two weeks' duration. The drum-membrane was pale, thickened, and perforated, and hearing much diminished. No fever. September 5th, patient had pain in the left side of the head, the discharge increased, and the mastoid region became swollen. The walls of the external auditory meatus were much swollen.

September 11th, the **usual mastoid operation** was done, since all symptoms had increased. The mastoid cells were full of granulation tissue and some pus, and all such tissues and material were scraped away down to normal bone. The wound was treated by packing. The course was normal up to October 25th, by which time there was only a small fistula remaining, but on that date the patient began to have headache, dizziness, nausea, and some fever, and the discharge from the fistula became profuse. There was also pain and swelling in some of the large joints.

Another operation was done with the idea of exposing the sinus, and during its course the vessel was wounded, so that the operation had to be suspended. However, after a few days, with symptoms of chill, fever, and pain in the joints, all conditions began to improve, and in about six weeks the wound was entirely healed.

REMARKS: We may see from this case that the sinus may be opened under aseptic precautions without danger, but I do not agree with Leutert in saying that opening the

sinus is entirely harmless. The danger of forming an artificial thrombosis has been overestimated, for Eberth and Schimmelbusch have shown how difficult it is to produce a thrombus artificially, and when the attempt is made, the thrombus is small and limited to the site of the traumatism, and consists of a mass of blood-cells. A thrombus due to infection is another matter, and its formation requires a previous inflammation of the whole vessel-wall, by which the bacteria gain access to the interior of the vessel and exercise their influence upon the blood for a considerable period. A thrombus may also be formed from a slowing of the blood current, with some predisposing condition in the blood. We may be certain that an aseptic puncture or injury of the uninflamed sinus wall will not cause thrombosis, but if there is inflammation present, such a formation is certain to appear.

I can introduce at this point **two fatal cases of thrombotic pyæmia,** which I operated upon but did not treat afterwards.

Case 8.—The first patient was a soldier, twenty-two years old, with a chronic suppurative otitis media, in the third week of which a typical pyæmic fever with chills developed. He was somnolent, had pain in the occipital region, his spleen was enlarged, and there was great prostration and some delirium. The conditions persisted for a week, and then I **operated** upon his mastoid, and found it full of pus and granulation tissue. The dura did not pulsate, and the sinus was slit open, and found to contain a yellowish-red thrombus, which, however, did not obstruct the whole lumen. The operation had no effect upon the course of the pyæmia already developed, and large abscesses formed in various parts of the body. The patient finally died from hemorrhage from a large vessel in the floor of a gluteal abscess cavity.

At the **autopsy,** the left lateral sinus was found completely obliterated by a dense, partially organized, reddish, shining thrombus. The rest of the body showed the ravages of the pyæmia.

Case 9.—The other patient was also a soldier, aged twenty-three, with a chronic suppurative otitis media. I saw him first in the third week of the disease, and at the time he looked pyæmic.

Examination showed that he had all the signs of an intense pyæmic infection, and although the prospects were very bad, the operation of exposing the sinus was undertaken. The sinus was gray, covered with a layer of pus, and when opened was found filled with a friable, yellowish pus thrombus, which was removed with the spoon as far as the torcular one way, and the jugular vein the other. The treatment of the abscesses in other parts of the body was postponed. The patient died in three days. At the autopsy more thrombi were found in the sinus and in the jugular vein; there was pus in many joints and other evidences of general infection.

Both these cases are examples of pyæmia developing from sinus infection, and it seems as if the first one ought to have recovered if the infection had not already got into the joints, since the thrombus in the sinus was already partly organized, and thus prevented any further dissemination of infection. The fatal hemorrhage undoubtedly came from some large eroded vessel. When we compare such cases with cases without thrombus, no matter how apparently very bad, we are convinced that most of the former end fatally, while in the latter the chances of recovery are good. The supporters of the view that an otitic pyæmia can develop without the involvement of a sinus explain the occurrence by the direct transmission of the infectious germs through the vessel-walls. Many observers believe that cured cases of otitic pyæmia did not originate in sinus thrombosis, but such an origin without thrombosis is probably rare. *Those who believe in the occurrence of pyæmia without thrombosis base their views upon the following facts:*

1. Osteomyelitis in bones causes pyæmic infection by transmission of the germs through the minute veins, and there is no reason to suppose that the process, when it is in the mastoid, is any different. 2. When there is a thrombus in the sinus, the neighboring bone is usually healthy, a fact which shows that the thrombus is secondary. 3. In many such fatal cases of pyæmia no thrombus is found at autopsy. 4. Many cases of pyæmia have recovered after a simple chiselling of the mastoid or opening the sinus. Leutert, however, denies that there is an analogy between the mastoid and other bones.

It is not always possible to say, from a macroscopic examination, whether the bone is the seat of inflammation, since the redness disappears after death, but the microscope affords us some information upon this point.

Moreover, osteomyelitis does not always cause thrombosis in the neighboring section of sinus. The thrombus, when present, is almost always in the bulb of the jugular vein, and small fragments of a degenerated thrombus may very easily be overlooked.

My own experience causes me to make a distinction between pyæmia with and pyæmia without thrombus, but I do not deny that absence of a thrombus in the sinus necessarily means that there is not a thrombus somewhere else. From the therapeutic point of view the thrombus in the lateral sinus is the most important, since here it is commonest, and here it is accessible to surgical treatment. In my opinion, when puncture with the needle gives a negative result, there is no thrombus present, and that in the beginning stages of a septicæmia, or septico-pyæmia, there is no thrombus. The comparatively favorable course of the cases of pyæmia without thrombosis seems to depend upon the fact that when the bacteria and their toxic products enter the blood current in such cases, they are scattered very quickly through the circulation, and unless the quantity is overwhelming, the white cells and the serum have a chance to neutralize or destroy them ; if, however, there is a thrombus present, when the infectious elements enter the vein from the osteomyelitic bone, they find a favorable ground in which to grow, and also a slowed or stopped blood current which prevents the serum and leucocytes from acting to any extent. The pyæmic process is made still more active by the dissemination through the body of infectious emboli. Sometimes cases of pyæmia with thrombus are very mild at first, and the course is much like that of intermittent fever, and some cases of pyæmia without thrombus that give very severe symptoms at first. Sometimes the joint lesions occurring in the course of a septico-pyæmia such as we are describing will resemble very closely those of rheumatism.

I should like to introduce here the histories of three cases seen in the year 1895.

CASE 10.—**Fatal Acute Abscess in the Temporal-Sphenoidal Lobe.**

Patient had an acute otitis media which lasted three weeks, and did not suppurate. The patient was discharged with normal hearing. Two weeks later he died and the

Autopsy showed an unencapsulated abscess in the right temporal lobe as large as a hen's egg. There was a carious spot in the tegmen tympani 6 *mm* in diameter. The tympanic cavity and the mastoid showed no signs of disease.

CASE 11.—**Acute Otorrhœa, Pachymeningitis, Purulent and Superficial Softening of Cerebellum.**

Patient was brought to the hospital on account of severe dyspnœa and dysphagia, and an acute otitis media on both sides which had existed a week. In nine days all the symptoms had disappeared, and the patient felt well. On the tenth day he suddenly began to vomit, and soon became unconscious and died.

The **autopsy** showed a superficial softened area in the right lobe of the cerebellum, and a purulent inflammation of the dura covering it. There was pus in each tympanic cavity and some thickening and redness of the mucous membrane.

CASE 12.—**Acute Otorrhœa, Thrombosis of Lateral Sinus, Inflammation of Tentorium and Cerebellum.**

Patient admitted with an acute suppurative otitis media of one week's duration. There is occipital headache. Next day symptoms are better, and during the following four days the patient felt very well. On the fifth day the temperature rose above 40° C., and the pulse was 120. In a few hours a rapid pulmonary œdema developed, and the patient died in ten minutes.

Autopsy showed a suppurative inflammation of the surface of the cerebellum and of the tentorium, and a broken-down thrombus in the right lateral sinus. There was pus in the right tympanic cavity.

Remarks: Case 10 is remarkable in that there was a large otitic brain abscess, without any symptoms pointing towards it. The exact cause of the circumscribed carious area in the tegmen cannot be given. It is quite possible that the brain abscess had its beginning in a previous attack of otitis.

In Case 11 there was nothing to point towards any brain involvement. The sudden end might have been from a rupture of a brain abscess, but the autopsy did not reveal this. The dysphagia was probably caused by pressure in the region of the pons.

Case 12 was one of thrombotic pyæmia not diagnosticated during life. The ending of this case also resembled the symptoms of a ruptured brain abscess. It is remarkable in this case that the mind should have been clear until death. The localized inflammation in the dura is rare.

From my experience with the class of cases under discussion, I have come to the following conclusions:

1. There is much lacking in our knowledge of the complications which may arise in such cases.

2. Free opening of the abscess has a favorable influence upon the disease.

3. When there is otitic disease with constitutional symptoms, an operation upon the mastoid is indicated.

4. Opening the cranium is important, even if no inflammatory products are found, since pressure is thereby relieved.

5. If the probability of a thrombosis is present, a small aspirator must be introduced into the sinus so that we may decide if any more radical measures are necessary.

6. There is no danger of any further infection in puncturing the sinus under proper precautions.

7. Clinically, there are two forms of pyæmia, that with, and that without, thrombosis.

8. The thrombotic form of the disease is a sequel of the other form.

9. The thrombotic form almost always ends fatally, the non-thrombotic rarely so, with proper treatment.

10. It is often difficult to choose the best moment for operating, especially when the symptoms are severe. Severe symptoms usually mean immediate operation.

As an appendix to this paper I should like to describe

CASE 13.—**A Cerebral Abscess of Nasal Origin.**

The history of the case was, that the patient came to the hospital on account of headache and an intermitting fever. He was given quinine. After six days, he began to have sharp pain in

both ears. He soon felt better, and was well enough to talk and to smoke a cigarette. However, one evening he suddenly had violent headache, vomited once, lost consciousness, and in two hours was dead.

The **autopsy** showed the dura all over the anterior fossa much thickened, especially so over an area about 4 *cm* in diameter, and between it and the bone there was a layer of pus. In the right frontal lobe there was an abscess as large as a pigeon's egg, with its cavity almost empty. There was a small opening between the surface of the brain and the abscess, and the neighboring brain tissue was œdematous. Ears normal. Frontal and maxillary sinuses were filled with odorless pus. All the bones were normal, as were the teeth, and there was no discoverable connection between the cranial cavity and anything outside. The bacteria were streptococci and the diplococcus of Fränkel.

Remarks: The case has more anatomical than clinical interest. Just what symptoms the patient showed when he was admitted to the hospital are not certain, and headache and an intermittent temperature were the only things observed in the hospital. The autopsy, however, showed an inflammation in the nasal cavities, which had extended to the frontal sinuses, and had caused suppuration. The bursting of the abscess was of course the cause of the sudden death. The non-involvement of the bones is somewhat unusual. Such abscesses of nasal origin are exceedingly rare. The infection may be acute or chronic, and may be transmitted through a defect in the bone, natural or pathological, or through the ethmoidal veins. Frontal abscesses rarely cause localizing symptoms, and then only by transmitted pressure. The treatment of such cases is in an un satisfactory state.

ON CARTILAGINOUS INTERGLOBULAR CAVITIES IN THE CAPSULE OF THE HUMAN LABYRINTH.[1]

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(*With Plates I. and II. of Volume XXXI. of German Edition.*)

ON examining a pathological labyrinth I found in the cochlear capsule numerous peculiar, ramifying, large cavities, firmly imbedded in the bone, always in the vicinity of the cochlear turns, and filled throughout with hyaline cartilage. This led me to re-examine serial sections of two other labyrinths, and I found in them the same cartilaginous cavities.

In reviewing the literature I find occasional mention of such cavities, but no detailed account or description.

The technique followed in my research was as follows: The petrous bones were fixed in Mueller's fluid and subsequently in alcohol, decalcified in 5–10 per cent. sol. of nitric acid, hardened in 50–80 per cent. alcohol, with a small quantity of soda added to neutralize the acidity, dehydrated in absolute alcohol and imbedded in celloidin. The labyrinth was divided with a razor through its middle before imbedding it, so as to insure thorough impregnation of the tissue. Sections were stained in hematoxylin and hematoxylin and eosin. Twenty-four specimens from subjects of different ages, up to seventy-two years, were examined.

[1] From the Pathological Institute at Strassburg, Germany.

In every portion of the bony labyrinth—around the cochlea, vestibulum, and the semicircular canals—small, round, oval, and fusiform cavities were noticed. The more elongated ones often possessed lateral branches which communicated with similar spaces, forming apparently a complete circle. In some specimens the clefts were separated from one another, being surrounded by compact bone. The walls of these little cavities were of dense bone. Their interior was usually irregular, being studded with round, sharply defined elevations of bony tissue. Each elevation contained from one to three lacunæ with bone corpuscles. While the little osseous elevations varied considerably in size none were sufficiently large to obstruct the lumen of the cavity. The narrow spaces contained a homogeneous hyaline substance which readily took the hematoxylin stain. The larger ones, which were the most numerous, also contained a hyaline matrix, embracing a number of large, round, or oval encapsulated corpuscles—evidently cartilage cells. There were no blood-vessels within the cavities, but they were separated from the cartilage spaces by a ridge of bone of considerable thickness. I found, in other words, two systems of canals in the osseous labyrinth—(a) a system of blood-vessels, and (b), a system of cartilage-bearing spaces, each with a distinct bony wall. The chain of cartilage spaces was often broken, being replaced in parts by bone. A well-defined line of demarcation was visible between this compact bone and the osseous wall surrounding the blood-vessels. In the dense portions of bone triangular spaces similar to ordinary lacunæ were observed. These seemed to have been produced by a compression of the described spaces—whose osseous nodules could be outlined even in the compact bone. In other portions of the bone the change from a spongy to a more compact structure was more abrupt. The spherical bodies became more and more numerous and closely crowded, and the interspaces correspondingly smaller. The nodules finally coalesced to form dense bone in which cavities were only exceptionally found. The process, in brief, was an ossification of the cartilage within the anastomosing system of canals previously mentioned.

The relative position of the cavities to the spiral canal of the cochlea varies, some being parallel, others at right or oblique angles to it. Those situated at right angles sometimes perforated the bony wall and reached the periosteum of the spiral, where they spread out in a small circular zone. In such cases there seemed at times to be an entire absence of bone on that side of the canal, the hyaline cartilage apparently lying in contact with the periosteum.

Usually, however, a thin lamella of bone, marked on the side next to the cartilage by the same round elevations already mentioned, intervened.

To determine whether the cartilage contained in the ramifying canals was true cartilage, or cartilage in the state of ossification, the tissue had to be examined without decalcifying. To accomplish this, thin sections were sawed from the bone and fastened to a cover-glass by means of hot balsam. The tissue was then reduced by grinding it upon a fine stone. In these specimens, the tissue surrounding the cartilage cells, which in the decalcified specimens appeared homogeneous, was made up of large and small spherical bodies (Fig 3). Their formation was due to a deposit of granular lime salts.

In reviewing the scant literature on the subject under discussion, I found that Böttcher[1] speaks of calcified cartilage cells, observed by him in the petrous bones of full-grown cats and dogs. Politzer[2] found cartilage in the laminæ spiralis ossea. Gottstein[3] noticed similar tissue, undergoing ossification, in the cochlea of a child one year old. In a recent publication Habermann[4] described small macroscopic areas of cartilage in the bone below the ampulla of the posterior semicircular canal, containing large cartilage cells.

Cartilage spaces were discovered by Moos and Steinbrügge[5] in a carious specimen. The walls of the labyrinth were unusually transparent, and contained numerous normal

[1] *Verhandl. d. k. Leop. Carol. deutsch. Acad. d. Naturf.*, Bd. 35, 1873, S. 64.
[2] Lehrbuch. 1887, p. 457.
[3] *Archiv für Mikrosk. Anatomie*, viii., p. 148.
[4] *Archiv für Ohrenheilkunde*, Bd. 42. Heft 2.
[5] *Zeitschrift f. Ohrenheilkunde*, x., p. 94.

cartilage cells. These authors were inclined to look upon the condition, as a beginning of caries. In portions of the same specimen they found more compact bone structure, containing some ramifying passages, which were also thought to be the result of caries.

While this exhausts the literature on our subject proper, it might be of interest to note some of the changes which take place in the development of bone at other parts of the body. No mention has been made of the occurrence in fully developed bone, of cartilaginous cavities surrounded by spherical osseous walls. Gegenbauer[1] described such histological conditions, in the periosteal development of bone in the fœtus. The bone was composed of a multitude of closely crowded spherical bodies, with interspaces of various sizes. The tissue contained bone corpuscles. Gegenbauer called these osseous bodies *globuli*, and the spaces between them *interglobular cavities*.

The latter, he believed, formed a communicating system filled with a protoplasmic fluid. Identical conditions were found in the bone of young deer by Lieberkühn,[2] who considered the bony spheres as bundles of connective tissue invading the bone. Waldeyer[3] also attributed this formation to an ossification of invading connective tissue bundles. In a more recent publication, Gegenbauer[4] opposed the view of Lieberkühn and Waldeyer, claiming that the round bodies were distinct spheres. He had often seen them, most distinctly in the periosteal portion of a bone of an infant three months old. The cuts (Taf. iv., Fig. 13) accompanying his publication resemble so closely the conditions found by me in the labyrinth, that the terms globuli and interglobular cavities suggested by Gegenbauer, seem to express admirably the structural arrangement of the osseous labyrinth.

The conditions in Gegenbauer's case differed from mine, inasmuch as he found osteoblasts, where I found cartilage cells.

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[1] *Zenaische Zeitschrift*, Bd. i., p. 353.
[2] *Arch. f. Anat. u. Physiologie*, 1864, p. 600.
[3] *Archiv f. Mikroscop. Anatomie*, Bd. i., p. 372, 1865.
[4] *Zenaische Zeitschrift*, Bd. i., p. 244, 1867.

A diversity of opinion seems to have existed among former authors as to the formation of the globuli ossei. Such bodies have been described by Brand and Reichert,[1] H. Mueller,[2] Kassowitz,[3] and Tschichtowitsch.[4] The description of Kassowitz and one of his illustrations (No. 17) correspond strikingly with what I found in the labyrinth. He, however, found cancellous bone where I found compact bone with blood-vessels. This difference is plausible when we consider that Kassowitz and others observed the interglobular cavities only in enchondral ossification while in the labyrinth they were present at all ages. It seems, therefore, that **the labyrinth capsule occupies a peculiar histogenetic position. Interglobular cavities occupied by cartilage are present until late in life while in other bony structures they are only met with in bones of the fœtus or very young children.**

The osseous globuli and their inter-spaces in the labyrinth evidently have some connection with the process of ossification, though the exact part which they play has not as yet been determined. In normal enchondral bone-development they are present at the stage in which the medullary cavities have made their way into the calcified cartilage and opened partially the cartilaginous cavities. Between the narrow cavities lined with osteoblasts and that portion of the cartilage into which the cavities have not penetrated, a thin lamella of bone, sending irregular projections into the cartilage, is found at this stage. At present the most generally accepted view is that advanced by H. Mueller and others, that in normal enchondral bone-formation the globuli ossei are formed by the extension of narrow cavities into the calcified cartilage, and that bone-formation takes place from the marrow. Some authors, among them Kassowitz and Tschichtowitsch, pretend on the other hand that the globuli originate in the cartilage into which no marrow cavities have entered.

While I have not made a study of the embryonal ossification of the human labyrinth, I believe that the globuli ossei

[1] Cited by H. MUELLER.
[2] *l. c.*
[3] *Die Normale Ossification, etc.* Part i., p. 177.
[4] *Virchow's Archiv*, Bd. 148, p. 140.

of the adult's labyrinth develop from cartilage cells and their surrounding matrix, and not, as in the usual process of ossification, from the marrow. The cartilage cells with their surrounding capsule are not always imbedded in a hyaline matrix, as in normal cartilage, but are surrounded by a narrow area of bone. From this ring of bone a narrow osseous strip extends to one of the osseous globuli lining the cartilage spaces. It seems that the cartilage cells are about to coalesce with the osseous lining of the cavity containing them. In fact some of the cartilage cells take on the characters of osseous globuli. Some of the globuli ossei also retain some of the characters of the cartilage cell. These facts justify the belief expressed above that the globuli ossei of the labyrinth and the bone corpuscles of the interglobular cavities are formed from the cartilage cells contained in the interglobular spaces.

Description of Illustrations.

FIG. 1.—From cochlea of man forty-seven years old. *F*. Interglobular cavities containing cartilage.

G. s., Ganglion spirale.

P. a. i., Porus acusticus internus. *S. w.*, Cochlear turn. Zeiss, A, A, Oc. 4.

FIG. 2.—From cochlea of an adult. Interglobular cavity, highly magnified. Zeiss, D, D, Oc. 4.

(*a*) Osseous pedicles.

(*b*) Cartilage cells with osseous surrounding.

FIG. 3.—Ground specimen (not decalcified). Zeiss, D,D, Oc. 4.

Kz. Cartilage cells.

K. k. Granules of lime salts in matrix.

THE AFFECTIONS OF THE EAR IN ACUTE AND CHRONIC BRIGHT'S DISEASE.

By Dr. J. Morf, Winterthur, Switzerland.

Abriged and Translated by Dr. Arnold H. Knapp, New York.

DIEULAFOY was the first to draw attention to the frequent combination of disturbance of hearing with chronic nephritis. He and his pupils were enabled to collect 35 cases of aural complications in 72 patients with acute and chronic Bright's. These cases however were not sufficiently examined as to the aural symptoms and an exact localization of the lesion is not possible. Hence the generally accepted belief that ear symptoms in chronic nephritis are the prodromata or symptoms of uremic poisoning.

I have collected 53 cases out of literature, which with my own 3 observations make 56 cases. In all of these there can be no doubt of the connection between the aural disturbance and the nephritis.

The aural changes due to nephritis may be divided in two groups. The first group contains those disturbances due to pathological processes in the ear, macroscopic, microscopic, or revealed by the functional examinations; in the second group belong the cases where no tissue changes can be found to account for the functional disturbance.

The first group includes only affections of the middle and the inner ear. The middle-ear diseases are present in three forms: inflammatory, inflammatory-hemorrhagic, and hemorrhagic. It is difficult to estimate the labyrinthine affections as there are no autopsies on record.

The pathological changes in the temporal bones of neph-

ritic middle-ear disease differ but little from the changes found in other middle-ear affections. In the purulent forms there is an unusual tendency to necrosis and caries of the surrounding bony walls.

Inflammatory changes in the Eustachian tube and the naso-pharynx are often present at the beginning of the otitis, but they are sometimes absent.

Hemorrhages are usually very abundant, and occur in the middle-ear spaces. No hemorrhage into the labyrinth has thus far been proven at autopsy.

In the cases of the second group we have neither an otoscopic nor a functional examination to guide us in localizing the lesion. Various theories have been suggested to explain these cases. Field suggested that the increased arterial pressure causing distension of the labyrinthine vessels, with increased pressure within the labyrinth, excites or paralyzes the sound-perceiving elements in the cochlea; the intermittence of the sound disturbance being due to the varying pressure. This theory, however, cannot explain those cases where there is no hypertrophy of the left ventricle or where the heart activity is weakened. Opinions differ at present as to the effect of increased pressure within the labyrinth.

Rosenstein was the first, as far as I know, to consider the possibility of an œdema of the auditory tracts causing disturbance of hearing in nephritic patients. He cites the case of a woman, twenty-nine years old, suffering from intermittent fever with irregular febrile attacks. The attacks were accompanied with general dropsies, which disappeared. The hearing gradually failed. The urine was scanty, contained albumen and casts. The hearing was restored on the diminution of the dropsy, to fail again when the general œdema increased. The patient died with symptoms of œdema of the lungs. At the autopsy nothing could be found to account for the loss of hearing. The difficulty of recognizing, macroscopically, œdema of the brain is well known. Other authors favor the assumption of a transitory œdema as causing transitory functional disturbance in parts of the brain. The following observation of mine has bearing on this point. It was a case of bilateral nervous deafness whose cause was

hydrocephalus or convulsive seizures in early youth. The sudden increase of the deafness and the constant, intense headache at one stage seemed to be dependent on the nephritis and the œdema, as treatment of the latter brought back the hearing to its former degree and caused the disappearance of the tinnitus.

It is well known that nervous symptoms are prominent in uremia, and various cases have been published showing that the auditory nerve and its central tracts may be involved. The following case may also be taken as proof for this statement. The case was one of bilateral nerve-deafness following the use of quinine for malaria. At the onset of uremic symptoms caused by the chronic interstitial nephritis the loss of hearing became suddenly almost complete, with nearly constant tinnitus. In this case the œdema was very slight, in distinction to the preceding case. On suitable treatment directed against the kidney lesion the hearing returned to its former state. Notwithstanding hypertrophy of the left ventricle the arterial pressure was not raised, and it can hardly be assumed that unusual distension of the labyrinthine vessels could have caused the aural symptoms.

There are cases where the loss of hearing with the changed condition of the urine are the only signs of an existing nephritis. It is probable that it is then a symptom of chronic uremia. This is illustrated by a case where the result of treatment again showed the relation between the aural lesion and the nephritis. Besides slight visual disturbance, the loss of hearing was the only symptom which led me to examine the urine and discover the kidney disease. I am inclined to regard the anæsthesia of the auditory nerve and the tinnitus as symptoms of chronic uremia, confirmed by the slight diminution of vision, without ocular changes, which could be regarded as a uremic amblyopia.

In regard to the frequency of ear disease in nephritis, we have only the statistics of Dieulafoy. He found disturbance in the ear in 50 per cent. of nephritic cases, and slightly less frequent than the eye symptoms. The forms of the nephritis in which the aural complications occur are, according to Dieulafoy, in 16 cases:

Chr. parenchymat. nephritis.....	4 cases.
Chr. interstitial nephritis.....	4 "
Nephrite mixte[1].....	7 "
Ac. nephritis.....	1 case
	16 cases.

In 24 of the 56 cases collected by me, the special form of nephritis was mentioned as follows:

Ac. nephritis.....	4 cases.
Chr. parenchymat. nephritis.....	9 "
Chr. interstitial nephritis.....	11 "
	24 cases.

In the other cases, the term chronic nephritis was used.

In enumerating the symptoms we must distinguish between those symptoms due to previously existing pathological changes and the true nephritic symptoms which are joined to or modify the former.

The usual auditory symptoms are, subjective noises and a loss of hearing. Auditory hyperæsthesia was observed in one case. The subjective noises are of all kinds, duration, and intensity; though in general they seem to be worse at night. The deafness may vary in degree and duration.

The ear may become affected in any stage of the nephritis, though usually it follows an exacerbation of the kidney trouble in the form of diminished secretion of urine, increase of albumen, the appearance of œdema, or uremic attacks. The subsequent course of the aural lesion is directly influenced by the course of the nephritis. In 15 cases of nephritis, Pissot saw the ear become affected 11 times on the aggravation of the kidney lesion. According to the French writers, the ear became affected which was on the side where the facial œdema was most marked. The quantity and quality of the discharge in chronic purulent otitis are influenced by the œdema.

Voss remarks that in the late forms of scarlet-fever otitis there is one variety which is much more dependent on the nephritis than on the scarlet fever itself. The connection

[1] Transitional group from the parenchymatous to the interstitial varieties.

indeed is so intimate that the progress of the nephritis may be followed by the course of the otitis. Deafness and pain in one or both ears may follow, or even precede, a diminution of urine and the accompanying fever. There may be signs of a subacute otitis, which disappear again, or there may be an exudative otitis, and later otorrhœa. The discharge varies directly with the intensity of the albuminuria.

We have seen that the ear symptoms may be the only signs of a nephritis beyond the changes in the urine. In a short time, however, other symptoms, like œdema, uremia, visual disturbances, etc., make their appearance. Visual disturbances are often associated with the ear symptoms.

The diagnosis of a nephritic affection of the ear is confirmed when in addition to the nephritis a direct connection of the latter with the aural disturbance is ascertained. The diagnosis is easy when, with alarming symptoms of nephritis, one or both ears become acutely affected without any other known cause, or when variations in the course of the nephritis are associated with changes in the aural affections. The cases where the changes in the ear are the only symptoms are the most difficult to diagnosticate. Usually one is aided by the appearance of other symptoms. At any rate, in disturbances of the auditory organ without known cause, it is well to examine the urine.

As regards the second group of cases, an exact localization of the lesion is not possible. Nevertheless, there are a number of facts which indicate that we have to deal with the auditory nerve and its peripheral and central distribution. My three observations seem to me to permit only this explanation.

According to Gradenigo, affections of the auditory trunk are characterized by diminished, or lack of, perception for the middle tones, while in labyrinth affections the perception of the high tones is interfered with, and the middle and the low tones are well heard.

In those cases where hearing is diminished, but the functional examination proves negative, he believes our examination methods are at fault owing to insufficient delicacy, and advises examination with the galvanic current. In

affections of the auditory trunk, the nerve is said to have increased electrical irritability. As cerebral apoplexies are not rare in chronic nephritis, especially of the interstitial variety, it is possible for the auditory tracts to become interrupted by hemorrhage.

The prognosis, of course, depends on the nephritis, and, especially in the cases of the second group, it is not bad if the patient does not succumb to the kidney trouble or to some intercurrent disease before the ear trouble is healed. The ear trouble, nevertheless, is to be regarded as a complication which can be of grave import, especially in the purulent affections of the middle ear. The hemorrhages are always ominous, as they are usually soon followed by death. It is difficult to say what influence a nephritis may have on a previous ear trouble. I think on the whole that the influence can be said to be unfavorable.

The affections of the second group usually recover, while those of the first of course leave sequelæ.

The therapeusis consists of combined treatment of the kidney and ear trouble. The cases of the second group get better of themselves when the nephritis improves, while those of the first group require treatment just as the usual ear troubles do.

The complete literary references on the subject can be found in the *Zeitschrift f. Ohrenheilk.*, vol. xxx., pp. 342, 343.

CHLOROMA IN THE TEMPORAL REGION.

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Translated by Adolph O. Pfingst, M.D., Louisville, Ky.

THE infrequency of the occurrence of chloroma and its constant association with derangement of the hearing prompts me to report a case in which I recently made the post-mortem examination.

The condition was found in a boy six years old, in whom death took place about three months after the beginning of the trouble. A clinical account of the case has previously been published by Professor Koerner.[1]

Autopsy.—Near the middle of the vertex of the skull a nodule as large as a pea was found, lying partially in a corresponding depression in the bone. A portion of the node was discolored—yellowish green. The internal surface of the skull, after removal of the dura, presented a depression of the inner table at a point corresponding to the external depression. The dura was anæmic, and, parallel with the longitudinal sinus, there were a number of injected blood-vessels, between which some irregular red streaks were present. Numerous yellowish and grayish-red, button-like masses were also scattered along the longitudinal sinus. Near the apex of the frontal lobe a larger mass, about the size of a pigeon's egg, was found beneath the dura.

The pia mater, the brain substance, and the ventricles showed no abnormities. Upon removing the brain the transverse sinus on each side was seen bulging into the cranial cavity. The sigmoid sinus contained but a scant

[1] *Zeitschrift f. Ohrenheilk.*, Bd. 29; these Archives, xxvi., No. 3.

amount of fluid blood, a portion of it being replaced by long cords of greenish material, tightly adherent to the sinus wall. Upon removing the dura the same kind of material was found adhering to the external surface of the sinus. At points it perforated and entered the wall. The material varied in color from a light, yellowish green to a dark grass-green.

The tegmen tympani of the temporal bone was very thin. The internal auditory canal contained yellowish-green nodes, similar to those previously described, enclosing the facial and auditory nerves. Similar tissue was also present in the pterygoid processes of the sphenoidal bone.

Externally, in the region of the mastoid, an artificial opening (mastoid operation) led into the healthy-looking antrum.

A number of growths of the character of those previously described, and ranging in size from that of a pea to a cherry, were also found in the orbital cavity, especially in the fat surrounding the optic nerve, pushing the eyeball forward. Both temporal muscles were invaded by the same tissue, transverse section of the muscles showing well-defined, green areas intermingled with muscular tissue. All of the tumors had a firm consistence, and, upon section, a homogeneous appearance. They were not very vascular.

The rest of the body showed but unimportant abnormities. On the inner surface of the pleura grayish-pink and dark red hemorrhagic areas were visible. The lungs, upon section, presented areas differently colored from gray to dark red between normal lung substance. The darker areas contained little air; the others were well inflated. The bronchial glands were enlarged. The pericardium contained bloody masses similar to the pleura. Both ventricles of the heart were dilated and filled with light-colored liquid blood. Other organs were markedly anæmic, otherwise normal. Lymphatic glands, especially of the neck, were considerably enlarged.

Microscopically the peculiar new formation corresponded to the class of tumors described in publications of other authors as *chloroma*. The mass of the tissue was made up

of small round cells, with large nuclei and scant protoplasm —lymphocytes. Between the cells a delicate reticulum could be demonstrated (Biondi's method). In the dura the cells were frequently arranged in layers. But few cells with lobulated nuclei, as O. Schmidt described them, were found. Granule-cells with affinity for acid stains (eosin), as they have been observed in similar tumors, were present in but small numbers. They were most abundant in the cavities of the mastoid, and the marrow of the bones. Spindle-shaped cells, and large connective-tissue granule-cells (mast-cells), as Doch described them, were not found at all. On the other hand, some peculiar cells were found in the masses of tissue in the transverse sinus, the dura, and the ear. They contained, (*a*) large round cells with two cystoid nuclei, and (*b*) cells containing 4 to 5 nuclei.

The tumors were all poorly supplied with blood, though the blood-vessels were unaltered. The growths in the dura and the sinuses were pretty sharply defined, while those in the bone, the orbit, and the muscles infiltrated the surrounding tissue. This was especially the case in the muscles, where groups of cells were found lying between the primitive muscular fibres. The fibres of the muscular tissue were unaltered.

Especial attention was given in the examination to the organ of hearing, as the literature on chloroma enters but little into this field, notwithstanding the frequency with which the hearing is deranged in this affection. While the internal auditory canal contained a quantity of tumor substance, none had penetrated the internal ear proper. A number of the mastoid cells had been invaded, but not a trace of the pathological structure could be found in the tympanum. In regard to the cavities in the mastoid filled with chloromatous tissue, some doubt may be entertained as to whether they were really the mastoid cells. In the larger ones, where portions of the epithelial lining remained, it was evident that the growth had entered mastoid cells. In the smaller cavities, however, most of which were completely filled with chloromatous tissue, it was difficult to identify them as mastoid cells for want of normal structures. We could with

a reasonable certainty consider those which, beside tumor mass, contained a finely granular material, as mastoid cells, the granular matter resulting from an alteration in the normal cell contents due to the preparation of the specimen.

The condition of the bone around the infiltrated cavities differed somewhat in parts. Here and there normal osteoblasts were present, while in some portions numerous Howship's lacunæ containing osteoblasts were found. Outside of the changes mentioned the marrow of the mastoid and petrous bones, as well as that of the rest of the skull and also of the ribs, had undergone pathological changes which could be attributed to the chloromatous process. Instead of finding normal tissue in the marrow-spaces, they were filled with cells identical with those described in the chloroma of the dura. In parts they were larger and contained more of the acidophile granules. Layers of osteoblasts were also seen arranged over the bony trabeculæ.

In considering the cause of the defect in the hearing noted during life, the change on the interior of the bone could hardly be taken into account. On the other hand, the tumors in the internal meatus enclosing the auditory nerve undoubtedly played an important part in the disturbance of function.

The microscope showed that while the diseased tissue had not penetrated the nerve fibres proper, these had undergone marked degeneration (Weigert's stain).

As but a few cases similar to the one cited have found their way into literature, a *brief discussion of the pathology of these tumors* may be of interest. Considering the origin of the green pigment which characterizes the growths, K. Huber (1) and Chiari (2) classify it with the pigments of fatty tissue, and claim to have found it in the form of minute molecules in and between tissue cells. Von Recklinghausen (3) holds that a parenchymatous pigment, similar to the one present in old green pus, is the cause of the discoloration, as no pigment granules were observed by him. In the opinion of Waldstein (4) the pigment is a derivative of blood pigment. My experience would contradict the view of Huber and Chiari, as I was at no time able to find pigment granules.

Several of the cells were observed to contain small, fat globules, but they were found just as frequently in non-pigmented tumors, while in some of the highly pigmented nodes they were absent. The possibility of a fatty pigment can be excluded in our case. In the cases of Huber and Chiari, the oil globules which they observed had probably nothing to do with the pigmentation of the tumors. Another factor that would contradict their theory is that during the preparation of the tissue the hardening solution (formol) removed the fat from the tissue and left the pigment intact. Dock was able to demonstrate the presence of green pigment in tissue that had been preserved in absolute alcohol for a year. Waldstein's idea of the origin of the pigment in the blood was based upon the observation that pigmentation was always most marked where other evidences of hemorrhage were present. In my case I found the most pigmented masses along the sinuses; in fact, a diffuse green coloration of the sinus walls was observed in the vicinity of the chloromatous tissue.

While this in a measure would support Waldstein's view, it cannot be looked upon as proof positive. As to v. Recklinghausen's suggestion of an identity of this with the parenchymatous pigmentation, he himself has shown and emphasized the frequent occurrence of green pus without the presence of chromogenetic species of bacteria. A circumstance that could be mentioned in support of v. Recklinghausen's theory is the one alluded to by Dock (5), that in cases of marked leucæmia the leucæmic tumors have been observed to have a decided green color. In several cases of lymphatic leucæmia which I have seen a marked green discoloration of the enlarged glands was noted. In one case, a woman, fifty-five years old, several of the glands of the neck which were enlarged had a yellow interior and well-defined wedge-shaped and crescentic areas of green in the periphery. In the other case, a woman, seventy-one years old, the same condition existed in the abdominal lymphatic glands. The discoloration could not easily be mistaken for post-mortem changes, as the absence of all other signs of decomposition and the decided difference between the grass green of chlo-

roma and the dirty green of decomposition would exclude such a possibility. The appearance of pigmented areas in leucæmia, pseudo-leucæmia, and chloroma, as well as other features which they have in common, leaves little doubt that the three conditions are closely allied to one another. If we should accept the theory of v. Recklinghausen of a parenchymatous pigmentation it would be based merely on assumption, for the character and origin of parenchymatous pigmentation have never been satisfactorily explained. O. Schmidt (6) suggests the possibility of a change in form of the leucocytes which make up the lymphoma being accountable for the pigmentation, and claims to have seen a marked variation in their size and shape in the pigmented tumors. This view, while it appears plausible, does not agree with my own observations. I could find no variation in size or shape in the cells of the pigmented and non-pigmented areas. It was impossible to recognize with the microscope the areas in leucæmia which to the naked eye had a decidedly green cast. From a bacteriological standpoint my researches all gave negative results, though I made extended and careful experiments, including methods for anaërobic culture.

Authorities do not agree as to what class of tumors chloroma belongs. Huber looks upon it as periosteal sarcoma, while v. Recklinghausen places it in the same category with leucæmic and pseudo-leucæmic lymphomas. Huber's theory can hardly be accepted from the simple fact that sarcoma is by far the most frequent form of tumor originating in the bones and their membranes. Not only do many other varieties of tumor develop in bone, but, as we know, nearly every inflammatory process of the bone is accompanied by hyperplasia of the periosteum. While in our case the layers of osteoblasts in the mastoid and petrous bone could be used as an argument in favor of Huber's theory, this was the only feature that would lead to a diagnosis of sarcoma. There was not a gradual change in the shape of the cell from the spindle-shaped connective-tissue cell to the small round cell of chloroma to indicate that the dura was the base of origin of the neoplasm. There was, on the contrary, a sharp line of demarkation between the normal and pathological tissues.

The tumors were so much like lymphomas and lymphosarcomas in their histological make-up that but for their green color (macroscopic) the possibility of any condition but lymphoma would never have been entertained. Dock has shown that leucæmic blood can exist along with chloroma. Whether or not in our case the blood was leucæmic could not be determined, as it had not been examined during life. After death the blood showed a considerable increase in white corpuscles over normal, which, however, could have been a transitory increase—leucocytosis. O. Schmidt reported a case of chloroma and lymphoma occurring in an individual in which there was no leucæmia. In his case as in ours green masses were found side by side with non-pigmented enlarged lymphatic glands.

Chloroma, lymphosarcoma, and tumors of this kind which seem to have a toxic or infectious origin should hardly be placed in the same category with sarcomas and other autogenous tumors. The former are merely a manifestation of a general diseased condition of the organism. Though they may develop in large numbers in the body, each tumor must be looked upon as a primary condition and not as a metastatic formation depending on the dissemination of some primary autogenous growth. While they usually have a predilection for lymphoid tissue, they have been found in other parts of the body. Their predilection for lymphoid tissue, however, accounts for the development of chloroma in the cancellous tissue of the mastoid whose mucous membrane is characterized by its follicular structure.

As I have placed lymphosarcoma and chloroma in the same class of tumors, it would be of interest in considering the etiology of chloroma to mention the view recently advanced by Cordua, Ricker, and others of the close relation existing between lymphosarcoma and tuberculosis. Paltauf opposes this view, and is inclined to look upon the cases of Cordua (7), Ricker (8), and others, which had the clinical and anatomical characteristics of pseudo-leucæmia, as tuberculosis of lymphatic tissue running an atypical course. Weisshaupt (9) is also of the opinion that tuberculosis and pseudo-leucæmia are, from an etiological standpoint, inde-

pendent of each other, though he admits that some cases of tuberculosis of the lymphatic tissue resemble pseudo-leucæmia very much in their clinical course and in the pathological changes. It would be difficult indeed to decide positively in favor of one or the other of these theories. If in cases of pseudo-leucæmia the post-mortem examination reveals distinct evidences of tuberculosis of the lymphatic gland, the diagnosis of tuberculosis is certain. Not so, however, in the cases of Ricker and Paltauf, where the histological changes in no way resembled those of tuberculous glands, and where but isolated tubercle bacilli could be found. Paltauf and Ricker speak of cases of lymphatic enlargement in which the microscopical changes are characteristic of lymphosarcoma, yet isolated tubercle bacilli could be demonstrated in the tissue. They consider them as an atypical form of tubercular glands. While this view would appear plausible, a case which came under my observation, where the same pathological changes had taken place, however, without the presence of tubercle bacilli, leaves some doubt in my mind whether the diagnosis of tuberculosis was justifiable. Not only were the lymphatic glands enlarged at various parts of the body, but tumors were present in the lungs, liver, and spleen, a number of which had undergone cheesy and calcareous degeneration. Large sarcoma cells, similar to those described by Paltauf and Ricker, were easily recognizable. Giant-cells were not found. Some parts of the tissue were typical of simple lymphoma. In the search for the bacillus of tuberculosis, I examined pieces of every diseased portion of tissue carefully, the research extending over the course of a year. Results were all negative. This case could not possibly be considered as an atypical form of tuberculosis. It could perhaps be an intermediary condition between those atypical cases of tuberculosis which run a course similar to lymphosarcoma or pseudo-leucæmia, and some forms of lymphosarcoma. At any rate, a close etiological relation between them is probable. The generally accepted belief that hyperplastic lymphatic structure is brought about by bacterial or other poisons would be confirmative of the existence of a close etiological

relation. We know now that hyperplastic tonsils are often due to tubercular infection. I was myself able to find them quite frequently in enlarged tonsils. The poisons of many other species of bacteria have a similar effect upon lymphatic tissue, though the tubercle bacillus has most readily been demonstrated in this connection, and I therefore venture the opinion that the tubercle bacillus and its products are important etiological factors in lymphosarcoma and allied processes. This was impressed upon me in the case of chloroma, subject of my report, in which the microscope revealed the presence of tubercle bacilli in the faucial tonsils and several enlarged lymphatic glands of the neck, but at no other parts of the body. A number of more remote glands were enlarged, but contained no bacilli. One of them contained a miliary tubercular node without bacilli. O. Schmidt found in his case a number of such nodes in the chloromatous tissue of a rib, but attached no importance to it at the time. While we may not be ready to accept at once the suggestion of an identity between the etiological elements of tuberculosis and lymphosarcoma, the fact remains that a close relation exists between the two, which should lead to further research in this direction. In cases of chloroma a thorough search should be made for the bacillus of tuberculosis, with especial attention to the faucial tonsils, which furnish the avenue of entrance to the tubercle bacillus more frequently perhaps than is suspected.

1. K. Huber. *Arch. d. Heilkunde*, Bd. 9.
2. *Zeitschrift f. Heilkunde*, Bd. 4.
3. v. Recklinghausen. *Tagebl. d. Versamml. d. Naturf.*, 1885.
4. Waldstein. *Virchow's Archiv*, Bd. 91.
5. Dock. *Amer. Jour. of Med. Sciences*, Aug., 1893.
6. O. Schmidt. *Dissert.* Göttingen, 1895.
7. Cordua. *Arbeiten a. d. patholog. Instit. z. Gœttingen*, 1893.
8. Ricker. *Arch. f. klin. Chirurgie*, Bd. 50.
9. Weisshaupt. *Arbeiten a. d. patholog. Instit. z. Tübingen*, vol. i., 1891.

REPORT OF THE SEVENTH MEETING OF THE GERMAN OTOLOGICAL SOCIETY AT WÜRZBURG, MAY, 1898.

By Dr. SELIGMANN, of Frankfort-on-the-Main.

Translated by Dr. Jas. A. Spalding, Portland, Me.

Bezold opened the meeting Friday, May 27th, in place of the President, Siebenmann, who was unable to attend owing to illness. Bezold remarked that whilst our knowledge of the normal anatomy of the ear has attained a high degree of development, the surgery and the pathological anatomy of the ear are still advancing towards new triumphs. Great honor is due in the latter respect to v. Troeltsch, in whose actual workshop we are this day assembled. It was a good omen that the Society was meeting in the pathological laboratory at Würzburg, and in the name of the Society we will place to-day a laurel wreath on the grave of that great aurist, v. Troeltsch.

BUSINESS MEETING.

The Society now numbers 173 members; during the year one has died (Moldenhauer, of Leipzig), and 31 new members have been admitted.

Hartmann gave a brief account of the meeting at Moscow, at which he regretted to find but a handful of members of the Otological Society. He hoped that the International Otological Congress, to take place in London in 1899, would be better patronized by German aurists, and especially that the Society would participate in the exhibit to occur in connection with the Congress.

SCIENTIFIC SESSION.

Barth, Leipzig: **Scheme for Uniformity in Testing the Hearing of the Diseased Ear.**

Various conferences have shown to the satisfaction of the committee that nothing can be accomplished without further discussion by word of mouth and by letter amongst a much larger number of practical otologists than has hitherto been available.

It was voted to print the results of the conferences and forward them to the members for further discussion at the next yearly meeting.

BLOCH, Freiburg: **On a Uniform Nomenclature for the Results Obtained by Testing the Functions of the Ear.**

The author proposed to follow Prout and Knapp's suggestion of using h (Horologium) for the watch, and V (Vox) for voice; to place the result for the right ear above a horizontal line, and for the left ear beneath the line; and additionally to test separately for a high, and a low, whispered voice. Rinne's, Weber's, and Schwabach's tests were to be noted by placing in front of the horizontal stroke the fork employed, above it the result of Rinne on the right ear, and beneath it that on the left ear, behind the stroke the result of Weber's test, and next to it Schwabach's, the latter for one fork with the number of seconds by which the tone is heard longer or shorter than normal.

(A detailed report of this scheme will appear in a later number of these ARCHIVES.)

BEZOLD: **Determination of the Hearing in Correct Proportions.**

BEZOLD succeeded in determining by an apparatus constructed by Edelmann that the dying away of all forks takes place in one and the same manner. If we assume normal hearing as 1, and total deafness as 0, we have only to divide the elongation by the amplitude; the inverted result shows the hearing for the fork in question. The only necessity for making this test precise is that the sound from the fork shall die away very slowly.

DENNERT: **Acoustic Communications for Solving Physiological and Practical Questions in Otology; Demonstration of Apparatus and Methods.**

Experiments with harmonics deserve to be carried out constantly, because of value in both the above points of view. The author muffled resounding tuning-forks until only the noise of a blow upon them was audible. With this noise alone he could cause other forks of the same pitch to vibrate. This proves the identity of noise and tone. Further experiments on co-vibration with forks in various media revealed fixed adequate relations.

But the muscles of the ear, being organs of unstable equilibrium, must possess some accommodative power. The degree of muffling in fluids depends on the pitch of the tone, the pressure to which the liquid is subjected, and to its adhesion. These facts ought to be useful in judging such symptoms as diplacusis, and in deciding on the treatment.

BECKMANN : **On the Theory of Hearing.**

Waves of sound more probably enter the labyrinth through the round than the oval window. The writer cannot agree with the selective action on waves of sound ascribed by Bezold to the structures of the tympanum. The purpose of these is double, depending on whether the parts are at rest or in vibration. In the former case they protect the labyrinth. The vibrations after attaining the labyrinthine fluid facilitate the reception of sound. At the same time the tympanic apparatus serves as a damper. With lifted damper the patient can no longer isolate echoing or mingled tones. Some of the lower noises in the ear may depend on loss of damping,

PASSOW : **Otology and Deaf-Mutism.**

The exaggerative employment of speaking exercises in deaf-mutes, without choice of material, has led to many errors, and to a prejudice on the part of the teachers against the method. Only children with a remnant of hearing should be exercised in this manner. At the same time local treatment of the ear should be instituted. Passow succeeded in obtaining governmental inspection by skilled aurists, in all these institutions. He found at his first visit many idiots in the schools, and numerous cases of deafness due to ceruminous plugs, enlarged tonsils, and suppuration. The author was of the opinion that aurists and teachers in deaf-mute institutions ought to meet together to discuss the differences of opinion in regard to the best methods of teaching.

In the discussion, BEZOLD remarked that in one institute of 80 children, 27 were enabled by instruction to enter ordinary day schools and to study with the other pupils. He thought that the aurist should make the diagnosis and leave the question of proper instruction to the teachers.

MANN thought that children somewhat deaf were often incorrectly sent to deaf-mute institutes.

BARTH wished the topic set aside for special discussion at the next meeting, and SCHMIDT suggested publication of the topic in journals devoted to school hygiene.

HELLMANN: **The Development of the Labyrinth in the Torpedo Ocellata.**

We are first struck with the disproportionate thickness of the semicircular canals and the ductus endolymphaticus in comparison with the cochlear portion of the labyrinth. Moreover, the outer semicircular canal opens into the anterior, and thus communicates with the vertical.

The development begins with the formation of an ear furrow from the ectoderm in the form of invagination of the epithelium. Folding of the middle edge over the furrow produces an ear sac, the opening closes, and we have an aural vesicle with a minute orifice outward. The outer wall of the vesicle reveals a shallow furrow, above which originates the posterior semicircular canal, beneath, the outer canal. The anterior canal originates from a pocket in front. At the inner end of the vesicle arises the recessus labyrinthi, at the posterior end the long ductus endolymphaticus. The development as a whole resembles that in higher animals.

OSTMANN: **On the Reflex Excitability of the Tensor Tympani by Waves of Sound.**

The physiological significance of the intrinsic muscles of the ear has not yet been accurately determined. Previous experiments tend to show that the tensor is a protective apparatus against too powerful waves of sound. This idea is contra-indicated by the experiments of Hensen and others. Ostmann has proved that the reflex contractions of the tensor observed by Hensen in curarized animals lie in the same category with Bernard's experiments on frogs, and are consequently not reflex convulsions produced by waves of sound. Ostmann has lately studied in animals the action of the tensor on the *Mt*, and discovered in dogs poisoned with strychnia reflex contractions to waves of sound. A long series of experiments proved that the tensor, by virtue of its natural tonic tension, as well as when in a condition of contraction, is a protective apparatus against too powerful vibrations of sound.

STRAUSS: **Tuberculous Tumor of the Auricle.**

The patient, a woman of twenty-five years, had exhibited the tumor for twenty years. From red moistened patches developed nodules which gradually became confluent. The tumor grew to be 8 *cm* long and 17 *cm* in circumference. The microscopic preparations confirmed the diagnosis by abundant giant cells in a granulation tissue.

SATURDAY MORNING, MAY 28TH.

HARTMANN: **Otitis Media in Infants.**

This was a continuation of Hartmann's efforts to show that otitis media in infants is largely dependent on their nutritive condition. The difficulties of determining whether a disturbance of nutrition is due to the otitis, or to a primary affection of the digestive canal were discussed, and a large number of temperature- and weight-charts exhibited, with the aim of showing the influence of the otitis on the nutrition. With the appearance of the otitis the defecations changed for the worse, and the weight decreased. A causal connection seems assured in cases in which repeated exacerbations of the otitis ensued with disturbances of nutrition, the latter disappearing after paracentesis.

Conclusions.—It would seem as if otitis media of infants were connected with disturbances of nutrition, expressing themselves in altered digestion and decrease in weight; that with evacuation of the secretion by paracentesis digestion may become normal, followed by an increase in weight; increase in temperature occurring in the course of an intestinal disease in infants may be due to otitis media; finally, in all cases of increased temperature and decreased weight with intestinal affection in infants, the ears should be subjected to a careful examination.

HARTMANN exhibited a nasal forceps which differs from those of Grünwald in that one blade is perforated. By this device the portions seized are divided more accurately and more smoothly.

HABERMANN: **I. Apparent Embolic Affection of the Ear.**

A man of fifty-three suffered one night from an attack of hemiplegia, which in a few weeks disappeared, with exception of a slight weakness. Four years later a relapse, with frequent attacks of tinnitus, vomiting, and deafness. Whisper not heard on the side affected. The field of hearing embraced forks from c^1 to c^7. The affection is probably of embolic nature, possibly in the brain along the course of the auditory nerve.

II. Ocular Paralyses and Middle-Ear Suppuration.

Acute middle-ear suppuration, ceasing in ten days, but relapsing in three weeks with persistent headache. Mastoid fistula many years before. Sudden paralysis of the abducens. The dura was exposed, found to be hyperæmic, but was not opened. Habermann was of the opinion that the abducens had been reached by extension of the inflammation into the petrous and sphenoid

bones. The paralysis became permanent, but the other symptoms disappeared.

The discussion brought out various instances of similar paralysis; KATZ observing it in a meningitis due to extension of the suppuration through the internal ear.

JANSEN thought that the paralysis was due to a serous meningitis, which might be cured by puncture. The serous meningitis might be dependent on sinus thrombosis or epidural abscess.

MANN had observed this paralysis in a perisinuous abscess. Pressure alone can also excite paralysis, and this can occur in the simplest manner in case of the abducens.

BRIEGER had seen a latent meningitis, the only symptom being the abducens paralysis, and KILIAN the same symptoms follow suppuration of the nasal accessory cavities accompanied with orbital cellulitis.

JANSEN thought that the disease could more probably be referred to the pia mater.

HABERMANN ended the discussion by saying that suppuration of the accessory cavities could be excluded, and that he had forgotten to mention that he had seen abducens paralysis on the side opposite the ear affected.

III. Anchylosis of the Stapes, with Exhibition of a Specimen.

The case was due to suppurative rhinitis, with excessive thickening of the tympanic structures, exostoses on the stapes, and osteophytes on the promontory, together with high position of the internal jugular extending to the lower semicircular canal.

MANASSE: **Secondary Labyrinthine Alterations in Primary Epithelial Carcinoma of the Middle Ear.**

Two cases of carcinoma of the ear preceded by suppuration and terminating in carcinoma. In addition to carcinomatous masses (horny carcinoma) and formation of cicatricial tissue, there were discovered hyaline degeneration in the cochlea and canals, partly in the form of cells with hyaline, and partly as free hyaline drops. As the latter alterations affected the periosteum and neighboring tissue, the author regarded them as a stage of chronic internal periostitis of the petrous bone caused by the neoplasm.

JANSEN: **An Intratympanic Tumor.**

A tumor without secretion grew inside of two years in the upper quadrant of the *Mt.* As there was suspicion of malignancy the tumor was extirpated. Various experts to whom the tumor

was handed differed in their diagnosis. It may have been a thyroid-like structure, or an epithelial tumor originating from the *Mt* or its blood-vessels.

MANASSE, in the discussion, thought that the growth was an adenoma.

PANSE : Exhibited Specimens.

I. Sequestrum Containing the Facial Canal.

II. Acute Middle-Ear Suppuration with Rupture through the Labyrinth into the Cavum Cranii.

SCHEIBE : **Rupture into the Inner Ear in Acute Middle-Ear Suppuration.**

CASE 1.—*A Diabetic Man of Fifty-six Suffered from Influenza ; Acute Middle-Ear Suppuration ; Repeated Paracentesis Necessary.*

Incisions permanently closed in ten weeks. A fortnight later relapse of the middle-ear inflammation, but without suppuration. Death in three weeks from meningitis. The specimen showed various stages of osseous affection, rarefying osteitis, softening, and necrosis.

CASE 2.—*Cholesteatoma ; Rupture into the Horizontal Semicircular Canal.*

The exact time of rupture cannot be determined by symptoms. The rupture in acute suppuration varies from that in chronic, in that the former does not utilize the connective tissue but only the bone. There is no precise surgical method, and it must always remain expectant.

Discussion. — JANSEN : Rupture offers distinct symptoms. Through the canals we have vertigo, vomiting, disturbances of equilibrium, and nystagmus ; through the cochlea, great deafness. Nystagmus alone justifies the diagnosis. Rupture may take place indirectly into the upper semicircular canal through a subdural abscess. In chronic cases the point of rupture is invariably the horizontal canal. The operation should consist in removing the horizontal or even the vertical canal with narrow chisels or with the electro-motor drill. The more violent the attack the more marked the disturbances of equilibrium. Proliferations into the aqueductus cochleæ may excite serous meningitis, but they can be removed by an operation.

HABERMANN remarked that rupture into the horizontal canal is frequent but operable. SCHEIBE is afraid of splinters of bone entering the labyrinth. PANSE has seen pressure on the canal produce nystagmus and vertigo.

KATZ: **Demonstration of Anatomical and Pathological Conditions in the Ear.**

1. *Normal Furrows and Openings in the Anvil.*

A dry anvil showed deep and spout-like furrows, especially at the long process. It would seem as if such furrows would easily give rise to caries of the anvil under proper conditions.

2. *Tensor Tympani, Mucous Folds, with Formation of Lacunæ and Isolated Granulations.*

The horizontal mucous fold belonging to the tensor, and not generally exhibiting any opening, forms normally a chamber, in which we may have retention of pus and granulations, as various preparations proved. Owing to this fold it is better to divide the tensor from in front than from behind whenever indicated at all.

3. *Coloboma on the Stria Malleolaris of the Mt.*

Elevation of the cutis by round-cell infiltration in the abundant subcutaneous tissue; the proliferation occurred between the cutis and the membrana propria.

4. Specimen showing the occurrence of *Ganglion Cells in the Region of the Inner Auditory Cells in New-born Mice.*

Cells in the cochlea near the inner auditory cells, which resemble the olfactory cells discovered in the olfactory region by Golgi. They are not seen in the outer auditory cells.

5. *Osmium Preparations of the Same Region in the Cat.*

Flattened internal auditory cells with fibres extending downward and of a doubtful nature.

HAUG: **I. Neoplasm on the Auricle.**

Elephantiasis of the auricle. Microscopic examination showed lymphangioma with transformation into sarcoma.

II. Treatment of Otitis Externa Acuta.

The author formerly employed acetated clay, but now relies on an alcohol bandage, with which in two or three days he often gets marked improvement. A strip of gauze is inserted into the meatus, alcohol dropped upon it, and then an impermeable bandage applied. This should be changed daily.

Discussion: HOFFMANN had employed the same treatment in Jena.

BRIEGER: **On the Relation of Hypertrophied Pharyngeal Tonsil to Tuberculosis.**

The author describes the results of the histological examination of the pharyngeal tonsil in 78 cases. The possibility of foreign-body tubercles occurring in the pharyngeal tonsil must be kept in

mind. In the five cases where histologically the presence of tuberculosis was proven, the picture furnished was a clear one. In every case cheesy degeneration was present, but tubercle bacilli could not be found. The tubercles were situated in the various layers of the tonsil; the rest of the tissue was not changed.

In 20 cases the entire or a part of the pharyngeal tonsil after excision was introduced into the peritoneal cavity of the guinea-pig. In one case the result was positive; in another, doubtful.

Injections of tuberculin caused a general reaction in a number of children with adenoids, but this is not conclusive.

The long-supposed relation between hyperplasia of the pharyngeal tonsil and tuberculosis, based on clinical observations, requires a more critical investigation. A similar connection seems to exist only for the cervical glands and tuberculosis. Primary tuberculosis of the lymphoid tissue at the roof of the pharynx may serve as a factor in the development of lupus of the face, for in lupus of the mucous membrane the naso-pharynx is more frequently involved than the nasal cavities. It is remarkable that a large number of cases of facial lupus present a shape of the palate which is typical of children suffering from adenoids.

It is very difficult to decide whether the tuberculosis of the pharyngeal tonsil in a given case is the primary and only localization of tuberculosis. In the author's cases the tuberculosis of the pharyngeal tonsil ran a latent course and appeared to be the primary lesion, though on more careful examination other manifestations of tuberculosis were found. A hereditary taint was always present.

The danger of a meningitis from a latent pharyngeal tonsillar tuberculosis scarcely exists, nor is it likely that an infection of the lungs can take place unless by way of the lymphatics. An extension to the middle ear, however, is to be feared. As regards operative treatment, the danger of a general tuberculosis from opening up of the blood-vessels is not sufficiently proven.

Owing to lack of time all further discussion of papers was voted to be omitted.

BIEHL: **Melancholia as the Result of an Otitic Extradural Abscess.**

Six weeks after the beginning of aural suppuration lasting a week, melancholia was observed, with ideas of persecution and suicide. In the intervals new suppuration and mastoiditis. Suppuration beneath the periosteum; fistula; dura exposed to the an-

trum, with granulations. The melancholia ceased on the day after the operation.

PANSE: **Tinnitus Aurium.**

The writer described his manner of registering cases of tinnitus. The patient's description of the noise, contents of the tympanum, the side affected, rhythm, pitch of the tone, influence of movement of the body, of alcohol instilled into the meatus, of pressure on the tragus, inflation, and so on. Next came the hearing tests, determination of the pitch of the subjective noise by comparison with tones greatly separated in the scale, the difference between which is gradually abbreviated to one octave. The nearest *c* is then used to note the pitch of the subjective noise.

OSTMANN: **Experimental Investigations on Massage of the Ear.**

The first part of this paper has already appeared in these ARCHIVES, and the second will appear later. The present part discusses massage as electrically applied, and suggests the possibility and dangers of using inadmissible force on the *Mt.* This sort of massage should only be used in cases of impeded conduction from rigidity of the ossicles with simultaneous rigidity of the *Mt.*

AFTERNOON SESSION.

NOLTENIUS: **The Operative Treatment of Stapes Anchylosis.**

CASE 1.—*Bilateral Tinnitus with Stapes Anchylosis.*—In one ear permanent recovery by massage after Delstanche's method. In the other ear no change. In this ear operation to remove the hammer and anvil. The crura of the stapes broke, and pressure on the plate caused it to sink into the vestibule. No immediate reaction, but later serous exudation, infiltration of the whole region about the ear, and paralysis of the facial nerve. The tinnitus disappeared permanently.

CASE 2.—*Essentially the same, but a total failure from the operation,* which resulted in stenosis of the meatus. The lateral wall was chiselled away in both cases.

R. HOFFMANN: **A Case of Isolated Thrombosis of the Bulb of the Jugular Vein,** and **A Case of Sinus and Jugular-vein Thrombosis.**

The diagnosis in the first case was proved by the post-mortem examination. Both cases were operated on.

DUNDAS GRANT: **On the Treatment of Stapes Anchylosis.**

The observation of the so-called paracusis of Willis (*i. e.*, improvement of the hearing in shaking carriages, and so on) suggested the idea of transferring similar vibrations to the vertebral column. These were produced by an electro-motor, and applied twice daily for five minutes at a time. Two patients were permanently and greatly improved in hearing by this method.

KIRCHNER: **Malignant Tumors after Chronic Middle-Ear Suppuration.**

Whilst chiselling for chronic middle-ear suppuration, the surgeon came upon an indefinable mass with undiscoverable limits. An autopsy, two months later, showed the entire temporal bone transformed into a soft substance, easily cut with a knife. The microscope revealed sarcoma.

JANSEN: **Transplantation of Skin in the Radical Operation.**

Jansen now employs the flap suggested by Koerner, and tries to make it as long as possible by prolonging the incisions into the auricle and excision of the angle of the cartilage in front of the antitragus. In spite of this, gangrene of the flap cannot always be avoided. If the recovery is retarded, thin skin-flaps may be used. This may be done before or after the flap operation, if there is but little bleeding, with the result of obtaining full recovery in six or seven weeks. Good results have also been observed in empyema of Highmore's antrum.

WAGENHAUSER: **Injuries to the Ear from Detonating Balls.**

The custom prevailing in Tübingen of throwing detonating balls produced in one instance rupture of the *Mt* with a high degree of permanent deafness.

BECKMANN: **Demonstration of Instruments.**

1. Scissors for the total removal of the inferior turbinates.
2. A catheter with strong curvature of the long beak.

BEZOLD closed the session with thanks for the interesting papers presented.

MISCELLANEOUS NOTES.

APPOINTMENTS.

The following gentlemen have been appointed members of the staff of the Throat Hospital, Golden Square, London: H. TILLEY, M.D. (Lond.), F.R.C.S.; ST. CLAIR THOMSON, M.D. (Lond.), M.R.C.P., F.R.C.S.; F. POWELL, M.D. (St. And.); C. HEATH, F.R.C.S.

THOMSON, ST. CLAIR, M.D., F.R.C.S., has been appointed Surgeon to the Royal Ear Hospital, London.

SPICER, FREDK., Jr., M.D. (Durham), M.R.C.S., has been appointed Honorary Surgeon to the Metropolitan Ear, Nose, and Throat Hospital, Grafton Street, Fitzroy Square, London.

ROYAL EAR HOSPITAL.

Her Majesty, the Queen, has given a donation of twenty-five guineas to the new Building Fund of the Royal Ear Hospital, of which institution she has for fifty-seven years been the Patron.

BEQUEST.

The late Miss Day, of Oxford, has bequeathed £500 to the Eye and Ear Hospital, Portsmouth.

LARYNGOLOGICAL SOCIETY, OF LONDON.

OFFICERS FOR THE ENSUING YEAR.

President, H. TRENTHAM BUTLIN, F.R.C.S.; *Vice-Presidents*, J. W. BOND, M.D., A. BRONNER, M.D., F. DE HAVILLAND HALL, M.D., SCANES SPICER, M.D., T. J. WALKER, M.D.; *Treasurer*, W. J. WALSHAM, F.R.C.S.; *Librarian*, J. DUNDAS GRANT, M.D.; *Secretaries*, HERBERT TILLEY, M.D., WM. HILL, M.D.

ANNOUNCEMENT.

SIXTH INTERNATIONAL OTOLOGICAL CONGRESS.

The Sixth International Otological Congress will be held in London, on August 8, 9, 10, 11, and 12, 1899. *President*:—

Dr. URBAN PRITCHARD, Professor of Otology at King's College, London. The meetings will, by permission, be held at the Examination Hall of the Royal Colleges of Physicians and Surgeons, Victoria Embankment. The subject chosen for special discussion is "Indications for Opening the Mastoid in Chronic Suppurative Otitis Media." A large and influential **British Organization Committee** has been formed, the Treasurer being Mr. A. E. CUMBERBATCH, 80 Portland Place, London, W., and the Hon. Sec., Mr. CRESSWELL BABER, 46 Brunswick Square, Brighton. The International Otological Congress, which assembles every four years, met last in Florence, where a very successful gathering was held under the Presidency of Professor Grazzi.

ORGANIZATION COMMITTEE.

URBAN PRITCHARD, President-Elect.

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J. W. BARRETT, Melbourne; F. BULLER, Montreal; J. J. CURSETJEE, Bombay; W. K. HATCH, Bombay; T. HOPE LEWIS, Auckland; T. M. NAIR, Madras; W. C. SCHOLTZ, Cape Town.

A. E. CUMBERBATCH, *Treasurer.*

E. CRESSWELL BABER, *Hon. Sec.*

Contents of the latest numbers of the German edition of these Archives. (Zeitschrift für Ohrenheilkunde).

Vol. XXXIII., No. 1. Issued July, 1898.

I. O. KÖRNER. Hydrorrhœa nasalis, probably caused by a tumor of the hypophysis cerebri, perforating the sphenoidal cavity. (Appears in this number.)

II. H. PREYSING. Two cases of pachymeningitis and extradural abscess from acute mastoiditis. (Appears in this number.)

III. P. MANASSE and A. WINTERMANTEL. Report on 77 radical operations, Strassburg University ear-clinic.

IV. Report on the dispensary department of the Strassburg ear clinic during the years 1896 and 1897.

V. THOS. BARR. Case of labyrinth necrosis. (Translated from the English edition.)

VI. A. BARKAN. Chronic middle-ear suppuration; brain abscess, meningitis; operation, death. (Translated from the English Edition.)

VII. SELIGMANN. Report on the seventh meeting of the German Otological Society at Würzburg. (In this number.)

Systematic report on the progress of otology during the second quarter of the year 1898. (Will appear in our next issue.)

Short notes of societies, and book reviews.

Vol. XXXIII., No. 2. Issued September, 1898.

VIII. EDWARD HARTMANN. Two new cases of osseous anchylosis of the stapes. (From Prof. Siebenmann's ear-clinic in Basle.)

IX. L. TREITEL. Carcinoma of the ear.

X. FR. BEZOLD. Method (Schema) of examining the hearing power of diseased ears.

XI. BEZOLD and EDELMANN. Recording the vibrations of tuning-forks, and testing the acuteness of hearing according to correct proportions.

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